EXPRESSCLUSTER® X 4.0

HA Cluster Configuration Guide for Microsoft Azure (Windows)



Revision History

Ed	ition	Revised Date	Description
1	st	Apr 17, 2018	New guide
2	nd	Jul 26, 2018	Add notes on Heartbeat Timeout following memory preserving maintenance of Azure. 7.1.2 Notes on EXPRESSCLUSTER 7.2.2 Notes on EXPRESSCLUSTER

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Preface

Who Should Use This Guide

The HA Cluster Configuration Guide for Microsoft Azure (Windows) is intended for administrators who want to build a cluster system, and for system engineers and maintenance personnel who provide user support.

The software and setup examples introduced in this guide are for reference only, and the software is not guaranteed to run.

Scope of application

This guide covers the following product versions.

- EXPRESSCLUSTER X 4.0 for Windows (Internal version: 12.00)
- Windows Server 2016 Datacenter
- Microsoft Azure portal: Environment as of February 20, 2018
- Azure CLI 2.0

If the product versions that you use differ from the above, some display and configuration contents may differ from those described in this guide.

The display and configuration contents may also change in the future. Therefore, for the latest information, see the website or manual of each product and service.

How This Guide is Organized

Chapter 1	Overview: Describes the functional overview.
Chapter 2	Operating Environments: Describes the tested operating environment of this function.
Chapter 3	Cluster Creation Procedure: Describes the procedure to create an HA cluster using Azure DNS.
Chapter 4	Cluster Creation Procedure: Describes the procedure to create an HA cluster using an Internet facing load balancer.
Chapter 5	Cluster Creation Procedure: Describes the procedure to create an HA cluster using an internal load balancer.
Chapter 6	Error Messages: Describes the error messages and solutions.
Chapter 7	Notes and Restrictions: Describes the notes and restrictions on creating and operating a cluster.

EXPRESSCLUSTER X Documentation Set

The EXPRESSCLUSTER manuals consist of the four guides below. The title and purpose of each guide is described below:

EXPRESSCLUSTER X Getting Started Guide

This guide is intended for all users. The guide covers topics such as product overview, supported operating environments, updates, and known problems.

EXPRESSCLUSTER X Installation and Configuration Guide

This guide is intended for system engineers who install cluster systems using EXPRESSCLUSTER and for system administrators who maintain and operate installed cluster systems, and it describes requirements from for installing a cluster system using EXPRESSCLUSTER to for preparing to start operation. This guide follows the actual procedure for installing a cluster system to describe how to design a cluster system using EXPRESSCLUSTER, how to install and set up EXPRESSCLUSTER, how to check the system after setting it up, and how to evaluate the system before starting operation.

EXPRESSCLUSTER X Reference Guide

This guide is intended for system administrators. The guide covers topics such as how to operate EXPRESSCLUSTER, function of each module, maintenance-related information, and troubleshooting. The guide is supplement to the *EXPRESSCLUSTER X Installation and Configuration Guide*.

EXPRESSCLUSTER X Integrated WebManager Administrator's Guide

This guide is intended for system administrators who manage cluster system using EXPRESSCLUSTER with EXPRESSCLUSTER Integrated WebManager and for system engineers who introduce the Integrated WebManager. In this guide, details on required items for introducing the cluster system using the Integrated WebManager are explained in accordance with the actual procedures.

Conventions

In this guide, Note, Important, Related Information are used as follows:

Note: Used when the information given is important, but not related to the data loss and damage to the system and machine.

Important: Used when the information given is necessary to avoid the data loss and damage to the system and machine.

Related Information: Used to describe the location of the information given at the reference destination.

The following conventions are used in this guide.

Convention	Usage	Example
Bold	Indicates graphical objects, such as text boxes, list boxes, menu selections, buttons, labels, icons, etc.	
Angled bracket within the command line	Indicates that the value specified inside of the angled bracket can be omitted.	clpstat -s[-h <i>host_name</i>]
>	Prompt to indicate that a Windows user has logged on as root user.	> clpstat
Monospace (Courier)	Indicates path names, commands, system output (message, prompt, etc.), directory, file names, functions and parameters.	C:\Program Files
Monospace bold (Courier)	Indicates the value that a user actually enters from a command line.	Enter the following: > clpcl -s -a
Monospace italic (Courier)	Indicates that users should replace italicized part with values that they are actually working with.	> ping <ip address=""></ip>

Contacting NEC

For the latest product information, visit our website below:

http://www.nec.com/en/global/prod/expresscluster/

Chapter 1 Overview 1.1 Functional overview

This guide describes how to configure an HA cluster based on EXPRESSCLUSTER X (hereinafter referred to as "EXPRESSCLUSTER") using Azure Resource Manager on a Microsoft Azure cloud service.

Microsoft A	zure	
Fault Domain 0	Fault Domain 1	
FGA ENPRESSCLUSTER X	FG A EXPRESSCLUSTER	
VM	VM	
Blob Storage	Blob Storage	

Figure 1-1 HA Cluster on a Cloud Service (Using Azure DNS)

Operational availability can be increased by clustering virtual machines (VMs in Figure 1-1) using a Microsoft Azure region and availability set in a Microsoft Azure environment.

Microsoft Azure region

Physical and logical units called a Microsoft Azure region are provided.

It is possible to build all nodes in a single region (such as Japan East or Japan West). However, if all nodes are built in a single region, there is a possibility for nodes to go down due to a network failure or natural disaster, causing interruption to the flow of business. Distributing nodes into multiple regions can improve the operational availability.

Availability set

Microsoft Azure allows each node to be deployed in a logical group called an *availability set*. Locating each node in an availability set minimizes the impact of planned maintenance or unplanned maintenance due to a physical hardware failure of the Microsoft Azure platform. This guide describes the configuration using an availability set.

For details about an availability set, see the following website:

Manage the availability of Windows virtual machines in Azure:

https://docs.microsoft.com/en-us/azure/virtual-machines/windows/manage-availability

1.2 Basic configuration This guide assumes two types of HA clusters. One is an HA cluster using Azure DNS of the Resource Manager deployment model. The other is an HA cluster using a load balancer of the Resource Manager deployment model. (Both HA clusters are configured as a unidirectional standby cluster.) The following table describes the EXPRESSCLUSTER resources to be selected depending on the Microsoft Azure deployment model in use.

Purpose	EXPRESSCLUSTER resource to use
Accessing the cluster by using a DNS name (Use Azure DNS recordset)	Azure DNS resource
Accessing the cluster by using a virtual IP address (Use frontend IP address of load balancer)	Azure probe port resource

HA cluster using Azure DNS

In this configuration, two virtual machines are deployed the same resource group so that the cluster can be accessed by using the same DNS name. The EXPRESSCLUSER Azure DNS resource uses Azure DNS to enable access with a DNS name. For details about Azure DNS, see the following website:

Azure DNS: https://azure.microsoft.com/en-us/services/dns/

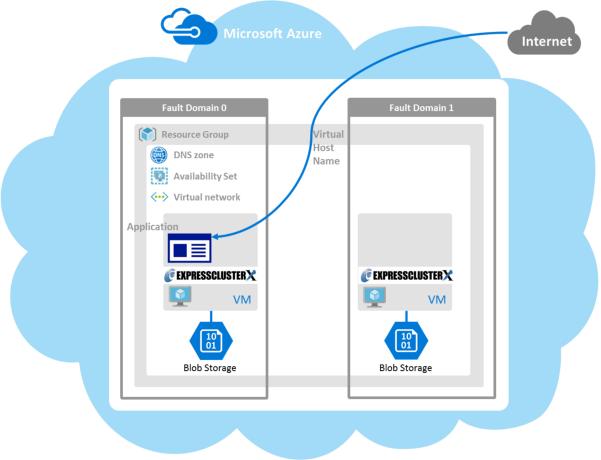


Figure 1-2 HA Cluster Using Azure DNS

These two virtual machines use the same availability set to minimize the impact of planned maintenance or unplanned maintenance due to a physical hardware failure of the Microsoft Azure platform.

The cluster in Figure 1-2 is accessed by using the DNS name of the Azure DNS zone. EXPRESSCLUSTER manages record sets and DNS A records of the Azure DNS zone to find an IP address according to the DNS name. A client need not be conscious about the switching of virtual machines upon failover occurrence or group migration.

The following table describes the EXPRESSCLUSTER resources and monitor resources required for a HA cluster configuration using Azure DNS.

Resource or monitor resource type	Description	Setting
Azure DNS resource	Manages record sets and DNS A records of the Azure DNS zone to find an IP address according to the DNS name.	Required
Azure DNS monitor resource	Checks the existence of a record set and monitors whether the name resolution is available in Azure DNS.	Required
IP monitor resource	Monitors whether communication with the Microsoft Azure Service Management API is possible, and also monitors health of communication with an external network.	When an Internet facing load balancer is used, required to monitor communication between clusters that are configured with virtual machines, and also to monitor health of communication with an internal network.
Custom monitor resource	Monitors communication between clusters that are configured with virtual machines, and also monitors health of communication with an internal network.	When an Internet facing load balancer is used, required to monitor whether communication with the Microsoft Azure Service Management API is possible, and also to monitor health of communication with an external network.
Multi-target monitor resource	Monitors the statuses of both the IP monitor resource and custom monitor resource. If the statuses of both monitor resources are abnormal, a script in which a process for network partition resolution (NP resolution) is described is executed.	When an Internet facing load balancer is used, required to monitor health of communication between an internal network and external network.
Other resources and monitor resources	Depends on the configuration of application, such as a mirror disk, that is used in an HA cluster.	Optional

For details about other resources and monitor resources, see the following:
Chapter 5, "Group resource details" in the *Reference Guide*.
Chapter 6, "Monitor resource details" in the *Reference Guide*.

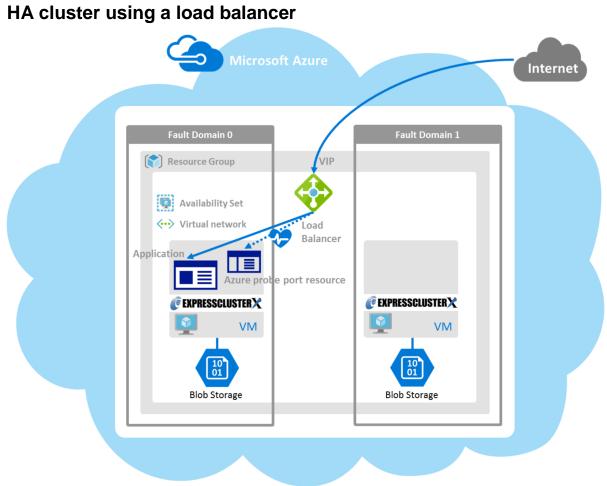


Figure 1-3 HA Cluster Using an Internet Facing Load Balancer

A client application can connect a virtual machine on an availability set in a Microsoft Azure environment to a cluster node by using a public virtual IP address (hereinafter referred to as VIP). By using a VIP, a client need not be conscious about the switching of virtual machines upon failover occurrence or group migration.

A cluster built in a Microsoft Azure environment in Figure 1-3 is accessed by specifying a global IP address of the Microsoft Azure Load Balancer (Load Balancer in Figure 1-3).

Active and standby nodes of a cluster are switched by using probes of Microsoft Azure Load Balancer. To use Microsoft Azure Load Balancer probes, use a probe port provided by the EXPRESSCLUSTER Azure probe port resource.

Activating the Azure probe port resource starts a probe port control process in standby for alive monitoring (access to a probe port) from Microsoft Azure Load Balancer.

Deactivating the Azure probe port resource stops a probe port control process in standby for alive monitoring (access to a probe port) from Microsoft Azure Load Balancer.

The Azure probe port resource also supports the Microsoft Azure internal load balancer (Internal Load Balancing: ILB). For the internal load balancer, a Microsoft Azure private IP address is used as a VIP.

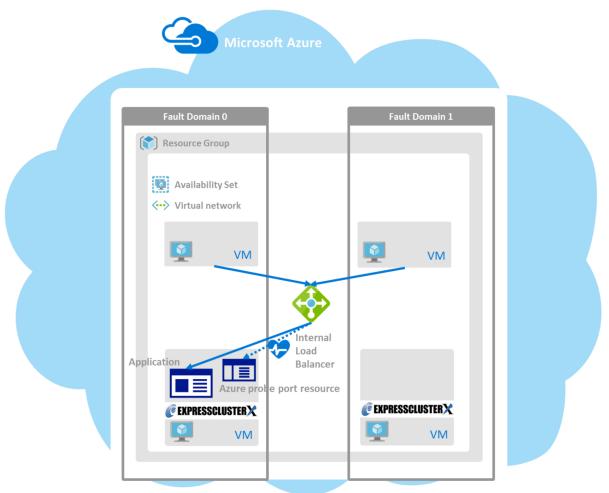


Figure 1-4 HA Cluster Using the Internal Load Balancer

The following are examples of two HA cluster configurations using a load balancer. Select a load balancer to use depending on your purpose.

Purpose	Load balancer to use	Creating procedure
Disclosing operations outside the Microsoft Azure network	Internet facing load balancer	See " Chapter 4 Cluster Creation Procedure (for an HA Cluster Using an Internet Facing Load Balancer)" in this guide.
Publishing operations within the Microsoft Azure network	Internal load balancer (ILB)	See " Chapter 5 Cluster Creation Procedure (for an HA Cluster Using an Internal Load Balancer)" in this guide.

The following table describes the EXPRESSCLUSTER resources and monitor resources required for a HA cluster using a load balancer.

Resource or monitor resource type	Description	Setting
Azure probe port resource	Provides a mechanism to wait for alive monitoring from a load balancer on a specific port of a node in which operations are running.	Required
Azure probe port monitor resource	Performs alive monitoring of a probe port control process, which starts upon activation of the Azure probe port resource, for a node in which the Azure probe port resource is running.	Required
Azure load balance monitor resource	Monitors whether a port with the same number as a probe port is open for a node in which the Azure probe port resource is not running.	Required
IP monitor resource	Monitors whether communication with the Microsoft Azure Service Management API is possible, and also monitors health of communication with an external network.	When an Internet facing load balancer is used, required to monitor communication between clusters that are configured with virtual machines, and also to monitor health of communication with an external network.
Custom monitor resource	Monitors communication between clusters that are configured with virtual machines, and also monitors health of communication with an internal network.	When an Internet facing load balancer is used, required to monitor whether communication with the Microsoft Azure Service Management API is possible, and also to monitor health of communication with an external network.
Multi-target monitor resource	Monitors the statuses of both the IP monitor resource and custom monitor resource. If the statuses of both monitor resources are abnormal, a script in which a process for network partition resolution (NP resolution) is described is executed.	When an Internet facing load balancer is used, required to monitor health of communication between an internal network and external network.
PING network partition resolution resource	When an internal load balancer (ILB) is used, monitors health of communication between subnets by checking whether to communicate with a device that is always on and can return a response to ping (ping device).	When an internal load balancer (ILB) is used, required to monitor health of communication between subnets.
Other resources and monitor resources	Depends on the configuration of application, such as a mirror disk, that is used in an HA cluster.	Optional

For details about other resources and monitor resources, see the following:
Chapter 5, "Group resource details" in the *Reference Guide*.
Chapter 6, "Monitor resource details" in the *Reference Guide*.

1.3 Network partition resolution

Virtual machines configuring an HA cluster mutually performs alive monitoring through a heartbeat communication. If the virtual machines exist in different subnets, an undesirable event, such as an application starting more than once, occurs if a heartbeat ceases. To prevent a service from starting more than once, it is necessary to identify whether other virtual machines went down or whether the applicable virtual machine was isolated from a network (network partitioning: NP).

The network partition resolution feature (NP resolution) sends ping to or checks a LISTEN port of a device that is always on and can return a response to ping etc. (access destination). If there is no reply, this feature judges that the device entered the NP status and executes the specified action (such as a warning, recovery action, and server shutdown).

The access destination used on Microsoft Azure described in the following table.

(*) A private IP address of an internal load balancer (ILB) cannot be used because it does not reply to ping.

Scope of disclosure	access destination	Procedure	EXPRESSCLUSTER resources, monitor resources, and commands to be used for NP resolution
Outside the Microsoft Azure Virtual network	Microsoft Azure Service Management API (management.core.wind ows.net)	Checking a LISTEN port	 Custom monitor resource clpazure_port_checker command
	each cluster server	Ping	IP monitor resource
Inside the Microsoft Azure Virtual network	Servers, excluding a cluster server, that exist within the Microsoft Azure network(*)	Ping	 PING network partition resolution resource

For details about NP resolution, see the following:

Chapter 7, "Network partition resolution resources details" in the Reference Guide.

Setting the NP resolution destination

You need to examine the NP resolution destination and method depending on the location of clients accessing a cluster system and the condition for connecting to an on-premise environment (for example, using a dedicated line).

How to judge the network partition status

EXPRESSCLUSTER provides the clpazure_port_checker command to judge the network partition status. Use this command as **Script created with this product** of the custom monitor resource or multi-target monitor resource.

For details about the clpazure_port_checker command, see the following subsections.

Checking the TCP port listening status (clpazure_port_checker command)

clpazure_port_checker Checks whether a LISTEN port exists among TCP ports of the specified server.

Command line

clpazure_port_checker -h hostname -p port

Description This command checks whether a LISTEN port exists among TCP ports of the server specified for an argument.

If there is no response five seconds (fixed) after the command execution, it is judged that an error (timeout) has occurred.

In case of an error, an error message is output to the standard output.

Executing this command from the custom monitor resource makes it possible to judge the network partition status.

For the configuration example of network partition resolution using this command, see "3.3 Configuring the EXPRESSCLUSTER settings" and "5.3 Configuring the EXPRESSCLUSTER settings"

Options	-h <i>hostname</i> -p <i>port</i>	Specify the determining server as <i>hostname</i> (by using an FQDN name or IP address). This option cannot be omitted. Specify the determining port number as <i>port</i> (by using a port number or service name). This option cannot be omitted.
Return values	0	Normal
	1	Error (communication error)
	2	Error (timeout)
	3	Error (invalid argument or internal error)

1.4 Differences between on-premises and Microsoft Azure

The following table describes the functional differences of EXPRESSCLUSTER between onpremises and Microsoft Azure. "Y" indicates that the relevant function can be used and "N" indicates that the relevant function cannot be used.

Function	On-premise	Microsoft Azure Resource Manager deployment model
Creating a shared disk type cluster	Y	N
Creating a mirror disk type cluster	Y	Y
Creating a hybrid disk type cluster	Y	N
Using the floating IP resource	Y	N
Using the virtual IP resource	Y	N
Using the Azure probe port resource	N	Y
Using the Azure DNS resource	N	Y

For the procedure to create a 2-node cluster using a mirror disk on an on-premise or Microsoft Azure environment, see the following subsections.

The difference of the procedure to create a cluster between an on-premise environment and Microsoft Azure environment is whether or not configuring the Microsoft Azure settings in advance is required.

HA cluster using Azure DNS

For Microsoft Azure, execute steps 1 to 6 in the following table after logging in to the Microsoft Azure portal (https://portal.azure.com/).

For Microsoft Azure, execute steps 7 to 17 after logging in to each virtual machine.

1					
Step No.	Procedure	On-premise	Microsoft Azure		
	Before installing EXPRESSCLUSTER				
1	Creating a resource group	Not required	See "3.2 Configuring Microsoft Azure" in this guide.		
2	Creating a virtual network	Not required	See "3.2 Configuring Microsoft Azure" in this guide.		
3	Creating a virtual machine	Not required	See "3.2 Configuring Microsoft Azure" in this guide.		
4	Setting a private IP address	Not required	See "3.2 Configuring Microsoft Azure" in this guide.		
5	Adding Blob storage	Not required	See "3.2 Configuring Microsoft Azure" in this guide.		
6	Creating a DNS zone	Not required	See "3.2 Configuring Microsoft Azure" in this guide.		
7	Setting up the DNS server	See the manual provided with the OS or DNS server.	Not required		
8	Setting a partition for the mirror disk resource	 See the following: "Settings after configuring hardware" in Chapter 1, "Determining a system configuration" in the <i>Installation and</i> <i>Configuration Guide</i>. "Understanding mirror disk resources" in Chapter 5, "Group resource details" in the <i>Reference Guide</i>. 	See "3.2 Configuring Microsoft Azure" in this guide.		

Step No.	Procedure	On-premise	Microsoft Azure	
9	Adjusting the OS startup time			
10	Checking the network setting	See "Settings after configuring hardware" in Chapter 1,		
11	Checking the firewall setting	"Determining a system configuration" in the <i>Installation</i>	Same as "On-premise"	
12	Synchronizing the server time	and Configuration Guide.		
13	Disabling the power saving function			
14	Installing the Azure	Not required	See "3.2 Configuring Microsoft Azure" in this guide.	
15	Registering the service principal	Not required	See "3.2 Configuring Microsoft Azure" in this guide.	
16	Installing EXPRESSCLUSTE R	See Chapter 3, "Installing EXPRESSCLUSTER." in the Installation and Configuration Guide.	Same as "On-premise"	
		After installing EXPRESSCLUST	TER	
17	Registering the EXPRESSCLUSER license	See Chapter 4, "Registering the license." in the <i>Installation</i> and Configuration Guide.	Same as "On-premise"	
18	Creating a cluster: Setting the heartbeat method	See "Creating the configuration data of a node cluster" in Chapter 5, "Creating the cluster configuration data" in the <i>Installation and</i> <i>Configuration Guide</i> .	The COM heartbeat, BMC heartbeat, and disk heartbeat cannot be used.	
19	Creating a cluster: Setting the NP resolution processing	 The network partition resolution resource is used. See the following: "Creating the configuration data of a node cluster" in Chapter 5, "Creating the cluster configuration data".in the <i>Installation and</i> <i>Configuration Guide</i>. Chapter 8, "Network partition resolution resources details" in the <i>Reference Guide</i>. 	See "5.3 Configuring the EXPRESSCLUSTER settings" in this guide.	
20	Creating a cluster: Creating a failover group and monitor resource	See "Creating the configuration data of a node cluster" in Chapter 5, "Creating the cluster configuration data".in the Installation and Configuration Guide.	 In addition to the references for on-premises, see the following: "Understanding Azure DNS resources" in Chapter 5, "Group resource details" in the Reference Guide. "Understanding Azure DNS monitor resources" in Chapter 6, "Monitor resource details" in the Reference Guide. "3.3 Configuring the EXPRESSCLUS settings" in this guide. 	

HA cluster using a load balancer For Microsoft Azure, execute steps 1 to 5, and 7 to 8 in the following table after logging in to the Microsoft Azure portal (https://portal.azure.com/). For Microsoft Azure, execute steps 6, and 9 to 15 after logging in to each virtual machine.

Step No.	Procedure	On-premise	Microsoft Azure
	Before installing EXPRESSCLUSTER		
1	Creating a resource group	Not required	 See either of the following depending on the load balancer to use: "4.2 Configuring Microsoft Azure" in this guide "5.2 Configuring Microsoft Azure" in this guide
2	Creating a virtual network	Not required	 See either of the following depending on the load balancer to use: "4.2 Configuring Microsoft Azure" in this guide "5.2 Configuring Microsoft Azure" in this guide
3	Creating a virtual machine	Not required	 See either of the following depending on the load balancer to use: "4.2 Configuring Microsoft Azure" in this guide "5.2 Configuring Microsoft Azure" in this guide
4	Setting a private IP address	Not required	See either of the following depending on the load balancer to use: • "4.2 Configuring Microsoft Azure" in this guide • "5.2 Configuring Microsoft Azure" in this guide
5	Adding Blob storage	Not required	 See either of the following depending on the load balancer to use: "4.2 Configuring Microsoft Azure" in this guide "5.2 Configuring Microsoft Azure" in this guide
6	Setting a partition for the mirror disk resource	 See the following: "Settings after configuring hardware" in Chapter 1, "Determining a system configuration" in the <i>Installation and</i> <i>Configuration Guide</i> "Understanding mirror disk resources" in Chapter 5, "Group resource details" in the <i>Reference Guide</i>. 	 See either of the following depending on the load balancer to use: "4.2 Configuring Microsoft Azure" in this guide "5.2 Configuring Microsoft Azure" in this guide
7	Creating and configuring a load balancer	Not required	See either of the following depending on the load balancer to use: • "4.2 Configuring Microsoft Azure" in this guide

Step No.	Procedure	On-premise	Microsoft Azure	
			 "5.2 Configuring Microsoft Azure" in this guide 	
8	Setting the inbound security rules	Not required	 See either of the following depending on the load balancer to use: "4.2 Configuring Microsoft Azure" in this guide "5.2 Configuring Microsoft Azure" in this guide 	
9	Adjusting the OS startup time			
10	Checking the network setting	See "Settings after configuring hardware" in Chapter 1,		
11	Checking the firewall setting	"Determining a system configuration" in the <i>Installation</i>	Same as "On-premise"	
12	Synchronizing the server time	and Configuration Guide.		
13	Disabling the power saving function			
14	Installing EXPRESSCLUSTE R	See Chapter 3, "Installing EXPRESSCLUSTER" in the Installation and Configuration Guide.	Same as "On-premise"	
		After installing EXPRESSCLUST	ER	
15	Registering the EXPRESSCLUSER license	See Chapter 4, "Registering the license" in the Installation and Configuration Guide.	Same as "On-premise"	
16	Creating a cluster: Setting the heartbeat method	See "Creating the configuration data of a node cluster". in Chapter 5, "Creating the cluster configuration data" in the <i>Installation and</i> <i>Configuration Guide</i> .	The COM heartbeat, BMC heartbeat, and DISK heartbeat cannot be used.	
17	Creating a cluster: Setting the NP resolution processing	 The network partition resolution resource is used. See the following: "Creating the configuration data of a node cluster" in Chapter 5, "Creating the cluster configuration data". in the Installation and Configuration Guide Chapter 8, "Network partition resolution resources details" in the Reference Guide. 	 See either of the following depending on the load balancer to use: See "4.3 Configuring the EXPRESSCLUSTER settings" in this guide. See "5.3 Configuring the EXPRESSCLUSTER settings" in this guide. 	
18	Creating a cluster: Creating a failover group and monitor resource	See "Creating the configuration data of a node cluster" in Chapter 5, "Creating the cluster configuration data" in the <i>Installation and</i> <i>Configuration Guide</i> .	 See the following in addition to the description of "On-premise." "Understanding Azure probe port resources" in Chapter 5, "Group resource details" in the <i>Reference Guide</i>. "Understanding Azure load balance monitor resources" in Chapter 6, "Monitor resource details" in the <i>Reference Guide</i>. 	

Step No.	Procedure	On-premise	Microsoft Azure
			 "Understanding Azure load balance monitor resources" in Chapter 6, "Monitor resource details" in the <i>Reference</i> <i>Guide</i>.
			 See either of the following depending on the load balancer to use: See "4.3 Configuring the EXPRESSCLUSTER settings" in this guide. See "5.3 Configuring the EXPRESSCLUSTER settings" in this guide.

Chapter 2 Operating Environments 2.1 HA cluster using Azure DNS

See the following:

 "Getting Started Guide" > "Chapter 3, Installation requirements for EXPRESSCLUSTER" > "Operation environment for Azure DNS resource and Azure DNS monitor resource"

00_04	
OS	Windows Server 2016 DataCenter
EXPRESSCLUSTER	EXPRESSCLUSTER X 4.0 for Windows(Internal version: 12.00)
Microsoft Azure	Resource Manager
deployment model	
Location	Japan East
Mirror disk size	Disk size: 20 GB
	(1 GB for a cluster partition and 19 GB for a data partition)
Azure CLI	2.0 (1.0 is not available.)
Python	2.7

The Azure CLI and Python must be installed because Azure DNS resource use them. Python is installed together with the Azure CLI 2.0.

For details about the Azure CLI, see the following website:

Microsoft Azure Documentation:

https://docs.microsoft.com/en-us/azure

Azure DNS must be installed because Azure DNS resource use it. For details about Azure DNS, see the following website:

Azure DNS: https://azure.microsoft.com/en-us/services/dns/

2.2 HA cluster using a load balancer

See the following:

"Operation environment for Azure probe port resource, Azure probe port monitor resource, Azure load balance monitor resource" in Chapter 3, "Installation requirements for EXPRESSCLUSTER" in the *Getting Started Guide*.

Chapter 3 Cluster Creation Procedure (for an HA Cluster Using Azure DNS)

3.1 Creation example

This guide introduces the procedure for creating a 2-node unidirectional standby cluster using EXPRESSCLUSTER. This procedure is intended to create a mirror disk type configuration in which node-1 is used as an active server.

The following tables describe the parameters that do not have a default value and the parameters whose values are to be changed from the default values.

•	Microsoft Azure settings	(common to node-1	and node-2)
---	--------------------------	-------------------	-------------

Setting item	Setting value
Resource group setting	
Name	TestGroup1
Resource group location	Japan East
Virtual network setting	
Name	Vnet1
Address space	10.5.0.0/24
Subnet name	Vnet1-1
Subnet address range	10.5.0.0/24
Resource group name	TestGroup1
Location	Japan East
DNS zone setting	
Name	cluster1.zone
Resource group	TestGroup1
Resource group location	Japan East
Record set	test-record1

• Microsoft Azure settings (specific to each of node-1 and node-2)

Setting item	Setting	y value	
	node-1	node-2	
Virtual machine setting			
VM disk type	HDD		
User name	testlogin		
Password	PassWord_123		
Resource group name	TestGroup1		
Location	Japan East		
Storage account setting			
Name	clstorageacc1		
Performance	Standard		
Replication	Locally-redundant storage (LRS)		
Network security group sett	ing		
Name	NetSecGroup-1		
Availability set setting			
Name	AvailabilitySet-1		
Update domains	5		
Fault domains	3		
Diagnostics storage account	Diagnostics storage account setting		
Name	clstorageaccdiag1		
Performance	Standard		
Replication	Locally-redundant storage (LRS)		
IP configuration setting			
IP address	10.5.0.120 10.5.0.121		

Setting item		Setting value	
	node-1	node-2	
Blob storage setting		<u>.</u>	
Name	Node-1Blob1	Node-2Blo	o1
Source type New (empty disk)			
Account type	Standard (HDD)		
Size	20		

• EXPRESSCLUSTER settings (cluster properties)

Setting item	Setting value	
	node-1	node-2
Cluster Name	Cluster1	
Server Name	node-1	node-2
Timeout Tab: Heartbeat	210	
Timeout		

• EXPRESSCLUSTER settings (failover group)

Resource name	Setting item	Setting value
Mirror disk resource	Name	md
	Details Tab: Data Partition	G:
	Drive Letter	
	Details Tab: Cluster	F:
	Partition Drive Letter	
Azure DNS resource	Name	azuredns1
	Record Set Name	test-record1
	Zone Name	cluster1.zone
	IP Address	(node1) 10.5.0.120
		(node2) 10.5.0.121
	Resource Group Name	TestGroup1
	User URI	http://azure-test
	Tenant ID	XXXXXXXX-XXXX-XXXX-
		XXXXXXXXXXXX
	File Path of Service	C:\Users\ testlogin\examplecert.pem
	Principal	
	Azure CLI File path	C:\Program Files(x86)\Microsoft
		SDKs\Azure\CLI2\wbin\az.cmd

•	EXPRESSCLUSTER settings	(monitor resource)	
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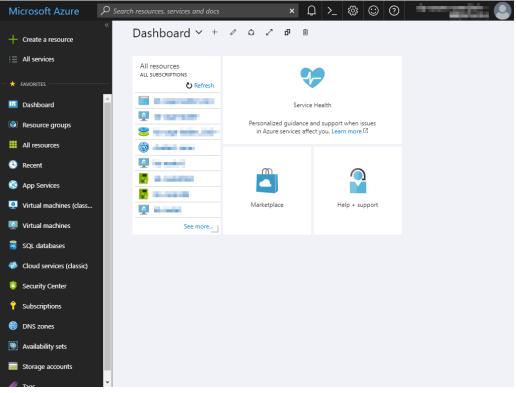
Monitor resource name	Setting item	Setting value
Mirror disk monitor	-	-
resource		
Azure DNS monitor	Name	azurednsw1
resource		
Custom monitor resource	Name	genw1
	Script created with this product	On
	Monitor Type	Synchronous
	Normal Return Value	0
	Recovery Action	Execute only the final action
	Recovery Target	LocalServer
IP monitor resource	Name	ipw1
	Server to monitor	node-1
	IP address	10.5.0.121
	Recovery Action	Execute only the final action
	Recovery Target	LocalServer
IP monitor resource	Name	ipw2
	Server to monitor	node-2
	IP address	10.5.0.120
	Recovery Action	Execute only the final action
	Recovery Target	LocalServer
Multi-target monitor	Name	mtw1
resource	Monitor resource list	genw1
		ipw1
		ipw2
	Recovery Action	Execute only the final action
	Recovery Target	LocalServer

3.2 Configuring Microsoft Azure

1) Creating a resource group

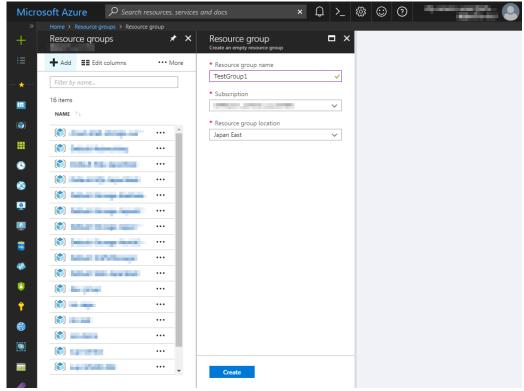
Log in to the Microsoft Azure portal (https://portal.azure.com/) and create a resource group following the steps below.

1. Select **Resource groups** or the resource group icon in the menu on the left side of the window. If there are existing resource groups, they are displayed in a list.



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2			10000.0000.0000	Japan East	
3			1000,000,000	Japan East	
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			weight, street, south	Japan East	
-			Terraria, press, parameter	Japan East	

3. Specify Resource group name, Subscription, and Resource group location, and click Create.

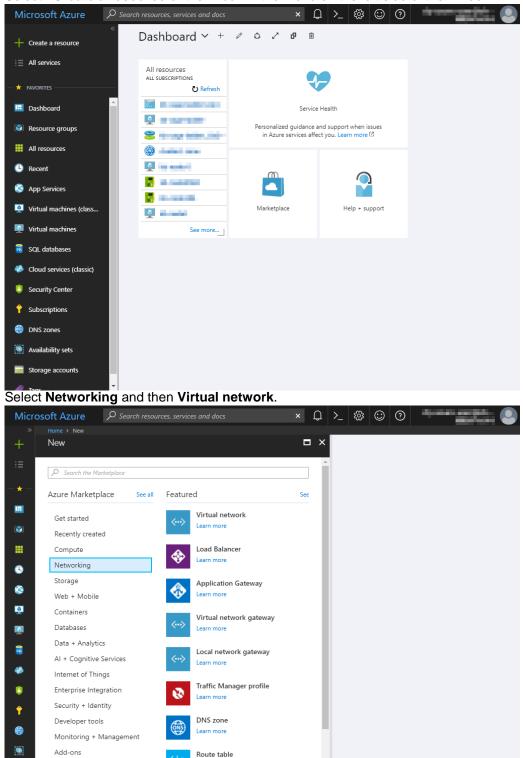


2) Creating a virtual network

2.

Log in to the Microsoft Azure portal (https://portal.azure.com/) and create a virtual network following the steps below.

1. Select +Create a resource or the + icon in the menu on the left side of the window.

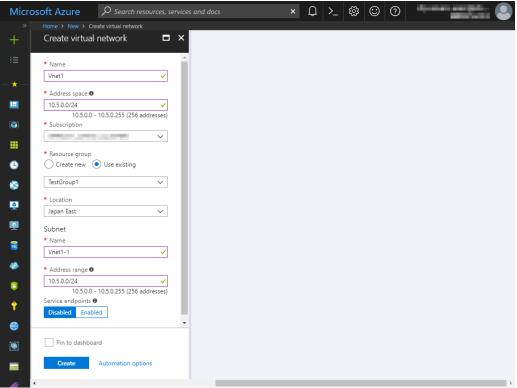


Learn more

ExpressRoute

Blockchain

3. Specify Name, Address space, Subscription, Resource group name, Location, Name of Subnet, and Address range, and click Create.



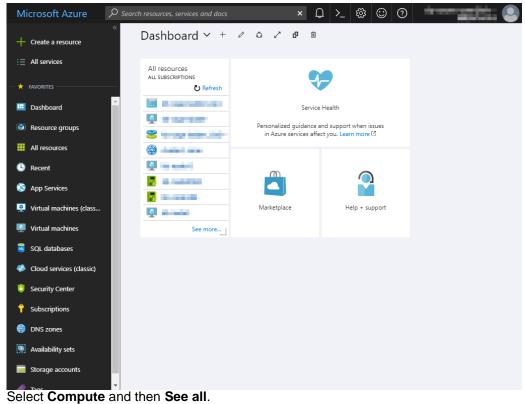
3) Creating a virtual machine

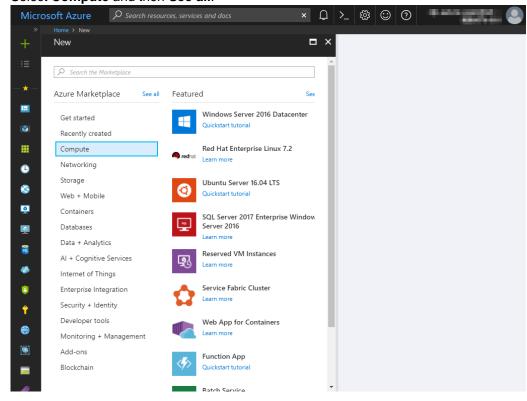
2.

Log in to the Microsoft Azure portal (https://portal.azure.com/) and create virtual machines and disks following the steps below.

Create as many virtual machines as required to create a cluster. Create node-1 and then node-2.

1. Select +Create a resource or the + icon in the menu on the left side of the window.





- 3. Select Windows Server 2016 Datacenter.
- 4. The Basics blade is displayed. Specify Name, VM disk type, User name, Password, Confirm password, Subscription, Resource group name, and Location, and click OK. For Name, specify node-1 for node-1 and node-2 for node-2.

Microsof	t Azur	e ${\cal P}$ Search resource			₽ >_	\$\$ O	0	
+	Create	virtual machine	×	Basics		×		
:≡ ^ _★_	1	Basics Configure basic settings	>	* Name node-1	~	^		
	2	Size Choose virtual machine size	>	VM disk type ● HDD * User name testlogin	~			
•	3	Settings Configure optional features	>	* Password	 			
©	4	Summary Windows Server 2016 Datacent	> er	* Confirm password •••••• Subscription	~			
				* Resource group 🖲 Create new 💿 Use existing	~			
•				TestGroup1	\sim			
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5. The **Choose a size** blade is displayed. Select the size appropriate for the usage purpose of the virtual machines from the list and click **Select**. In this guide, **A1 Standard** is selected.

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Choose	virtual machine size	1	vCPU	1	vCPU		1	vCPU	
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- 6. The Settings blade is displayed. Specify Availability set, Storage account, Public IP address, Network security group, and Diagnostics storage account.
- 7. Select No for Use managed disks.

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 + : Create virtual ma :≡ ^ 1 Basics Done 2 Size Done 3 Settings Configure op ▲ Summary 	achine × Set	gh availability ilability zone (Preview) ❶ one availability zones are available for ition you have selected. Current su tions are: East US 2, Central US, W	the upported			
 		ubnet ® net1-1 (10.5.0.0/24) ublic IP address ® ewb.node-1-in OK	>			

8. Return to the **Settings** blade and select **Availability set**. For node-1, the **Change availability set** blade is displayed. Select **Create new**. Specify **Name**, **Fault domains**, and **Update domains**, and click **OK**. For node-2, the **Change availability set** blade is displayed. Select AvailabilitySet-1 created for node-1

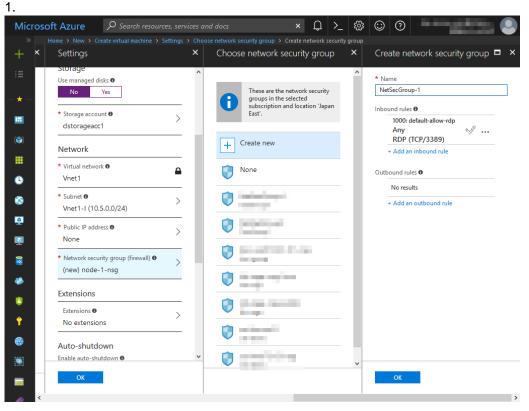
me → New → Create virtual machine → Setting Settings High availability Availability zone (Preview) ● No availability zones are available for the location you have selected. Current supported location are East US 2, Central US, West Europe.	×	Change availability set × You can create a new availability set or select an existing availability set in the same location and resource	Create new × Name AvailabilitySet-1
Availability zone (Preview) None No availability zones are available for the location you have selected. Current supported locations are: East US 2, Central US, West]	or select an existing availability set in the same location and resource	
* Availability set None None > Storage Use managed disks Ves Storage account devgroupdisks149 Network Virtual network Vnet1 Vnet1 Vnet1 Vnet1-1 (10.5.0.0/24) Vnet1-1 (10.5.0.0/24) Vnet0 (Paddress (newh node 1-in) Vnet1-1in 		group as the VM.	Fault domains 0

Select Storage account. For node-1, the Create storage account blade is displayed. Specify Name, Performance, and Replication, and click OK. For node-2, the Choose storage 9. account blade is displayed. Select clstorageacc1 created for node-1.

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- Return to the Settings blade and select Public IP address.
 The Choose public IP address blade is displayed. Select None. Ignore the Create public IP address blade.

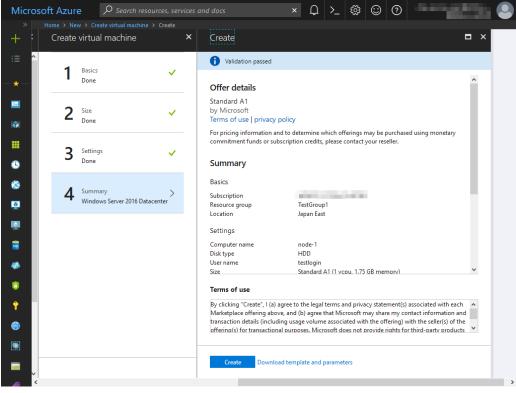
12. Return to the Settings blade and select Network security group. For node-1, the Create network security group blade is displayed. Specify Name and click OK. For node-2, the Choose network security group blade is displayed. Select NetSecGroup-1 created for node-



13. Select **Storage account**. For node-1, the **Create storage account** blade is displayed. Specify **Name**, **Performance**, and **Replication**, and click **OK**. For node-2, the **Choose storage account** blade is displayed. Select clstorageaccdiag1 created for node-1.

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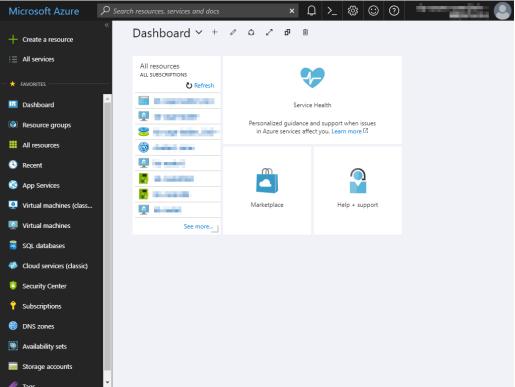
15. The **Create** blade is displayed. Check the contents displayed on the **Create** blade and click **Create** if the contents are correct.



4) Setting a private IP address

Log in to the Microsoft Azure portal (https://portal.azure.com/) and change the private IP address setting following the steps below. Since an IP address is initially set to be assigned dynamically, change the setting so that an IP address is assigned statically. Change the settings of node-1 and then node-2.

1. Select **Resource groups** or the resource group icon in the menu on the left side of the window.



2. Select TestGroup1 from the resource group list.

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3. The summary of TestGroup1 is displayed. Select virtual machine node-1 or node-2 from the item list.

TestGroup1 Resource group	1							
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4.

5. Select a network interface displayed in the list. The network interface name is generated automatically.

6. Select IP configurations.

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- 7. Only ipconfig1 is displayed in the list. Select it.
- Select Static for Assignment under Private IP address settings. Enter the IP address to be assigned statically in the IP address text box and click Save at the top of the window. The IP address of node-1 is 10.5.0.120. The IP address of node-2 is 10.5.0.121.

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9. The virtual machines restart automatically so that new private IP addresses can be used.

5) Adding Blob storage

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TestGroup1

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Log in to the Microsoft Azure portal (https://portal.azure.com/) and add Blob storage to be used for a mirror disk (cluster partition or data partition). Change the settings of node-1 and then node-2.

1. Select **Resource groups** or the resource group icon in the menu on the left side of the window.

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3. The summary of TestGroup1 is displayed. Select virtual machine node-1 or node-2 to which to add Blob storage from the item list and select **Disk**.

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4.

5. The Attach unmanaged disk blade is displayed. Click Browse right to the Storage container text box. For Name and Storage blob name, the automatically generated default values are entered.

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7. Select vhds from the container list and click Select.

8. The Attach unmanaged disk blade is displayed again. Specify Name, Source type, Account type, Size, and Storage blob name, and click OK. For Name, specify Node-1Blob1 for node-1 and Node-2Blob1 for node-2. For Storage blob name, specify Node-1Blob1.vhd for node-1 and Node-2Blob1.vhd for node-2.

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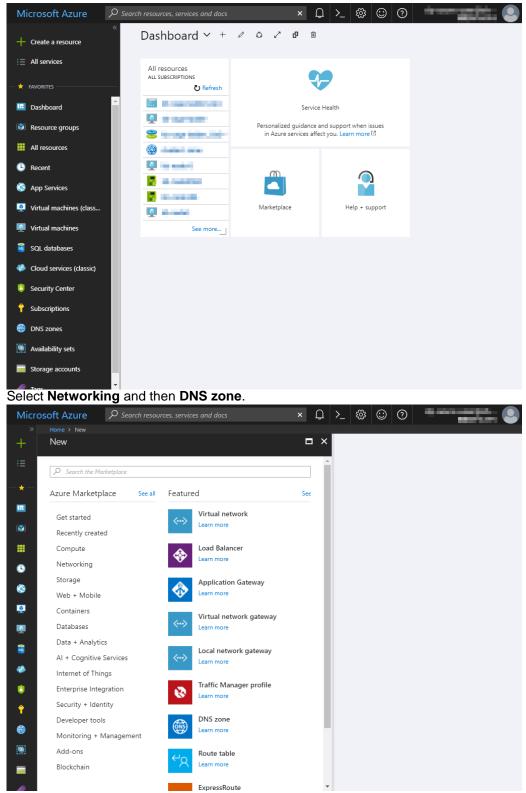
9. Click Save.

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6) Creating a DNS zone

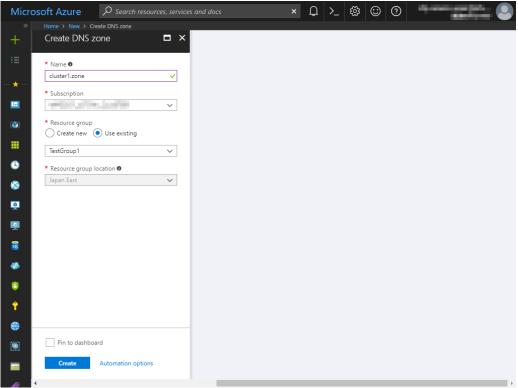
Log in to the Microsoft Azure portal (https://portal.azure.com/) and configure the DNS zone following the steps below.

1. Select +Create a resource or the + icon in the menu on the left side of the window.



2.

3. The Create DNS zone blade is displayed. Specify Name, Subscription, and Resource group, and click Create.



7) Configuring virtual machines

Log in to the created node-1 and node-2 and specify the settings following the procedure below. Set a partition for the mirror disk resource. Create a file system in the added Blob storage. For details about the partition for the mirror disk resource, see "Partition settings for mirror disk resource (when using Replicator)" in "Settings after configuring hardware" in Chapter 1, "Determining a system configuration" in the *Installation and Configuration Guide*.

1. Display the **Disk Management** window. The **Initialize Disk** dialog box is displayed.

Initialize Disk X	
You must initialize a disk before Logical Disk Manager can access it. Select disks: [V][Disk 2	
Use the following partition style for the selected disks: (MBR (Master Boot Record) GPT (GUID Partition Table) Note: The GPT partition style is not recognized by all previous versions of Windows.	
OK Cancel	

2. Confirm that the added disk is displayed as "Disk 2" in unassigned state under the existing C drive and D drive.

📅 Disk Managem	ient						-		×
<u>File Action Vi</u>	ew <u>H</u> elp								
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Volume	Layout	Туре	File System	Status	Capacity	Free Spa	% Free		
C:) Temporary Store	Simple ag Simple	Basic Basic	NTFS NTFS	Healthy (S Healthy (P	127.00 GB 70.00 GB	113.12 GB 68.77 GB	89 % 98 %		
Disk 0 Basic	(C;)				777777777777777777		7//////////////////////////////////////	7777	
127.00 GB	127.00 GB NTFS								
Online	Healthy (System,	Boot, Active,	Crash Dump, Pi	rimary Partition					
	<i><!--///////////////////////////////////</i--></i>					////////			
Disk 1 Basic	Terror Stor	aa (Dr)							-
70.00 GB	Temporary Stora 70.00 GB NTFS	ige (D:)							
Online	Healthy (Page File	e, Primary Pa	rtition)						
	1								
Disk 2 Basic									
20.00 GB	20.00 GB								
Online	Unallocated								
Unallocated	Primary partition								

- 3. Create a cluster partition. Right-click "Disk 2" and select **New Simple Volume**.
- 4. The Welcome to the New Simple Volume Wizard is displayed. Click Next.

New Simple Volume Wizard		×
	Welcome to the New Simple Volume Wizard	
	This wizard helps you create a simple volume on a disk.	
	A simple volume can only be on a single disk.	
	To continue, click Next.	
	< Back Next > Cancel	I

5. The **Specify Volume Size** window is displayed. Allocate 1024 MB (1,073,741,824 bytes) or more to a cluster partition. Click **Next**.

ew Simple Volume Wizard		
Specify Volume Size Choose a volume size that is betwee	en the maximum and minimum sizes.	
Maximum disk space in MB:	20477	
Minimum disk space in MB:	8	
Simple volume size in MB:	1024	
	< Back Next > Ca	ncel

6. The Assign Drive Letter or Path window is displayed. Select the F drive for Assign the following drive letter:. Use the disk as a raw partition without formatting.

New Simple Volume Wizard			×
Assign Drive Letter or Path For easier access, you can assign a drive lett	er or drive path	to your partition	
Assign the following drive letter: Mount in the following empty NTFS folder Do not assign a drive letter or drive path	F	v	
	< <u>B</u> ack	<u>N</u> ext >	Cancel

- 7. Next, create a data partition. Right-click "Disk 2" and select New Simple Volume.
- 8. The Welcome to the New Simple Volume Wizard is displayed. Click Next.
- 9. The Specify Volume Size window is displayed. Click Next.

New S	imple Volume Wizard		×
Spe	e cify Volume Size Choose a volume size that is between the r	maximum and minimum sizes.	
	Maximum disk space in MB:	19453	
	Minimum disk space in MB:	8	
	Simple volume size in MB:	19453	
		< Back Next > Cancel	

10. The Assign Drive Letter or Path window is displayed. Select the G drive for Assign the following drive letter: and click Next.

0	
New Simple Volume Wizard	×
Assign Drive Letter or Path	
For easier access, you can assign a drive letter or drive path to your partition.	
<u>Assign the following drive letter:</u> <u>G</u>	
Mount in the following empty NTFS folder: Browse	
Do not assign a drive letter or drive path	
< <u>B</u> ack <u>N</u> ext > Can	ncel
The Format Partition window is displa	aved. Confirm that File System is NTF
New Simple Volume Wizard	×
Format Partition To store data on this partition, you must format it first.	
Choose whether you want to format this volume, and if so, what settings you want to us	se.
O Do not format this volume	
Format this volume with the following settings:	
Figmat this volume with the following settings Elle system: NTFS	
Ele system: VTFS V	
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Ele system: NTFS Allocation unit size: Default Volume label: New Volume ✓ Perform a quick format	
Ele system: NTFS Allocation unit size: Default Volume label: New Volume ✓ Perform a quick format	

12. Click Next.

13. The **Completing the New Simple Volume Wizard** window s displayed. Check the displayed contents and click **Finish**.

New Simple Volume Wizard		×
	Completing the New Simple Volume Wizard	
	You have successfully completed the New Simple Volume Ward. You selected the following settings: <u>Volume type: Simple Volume</u> Disk selected: Disk 2 Volume size: 19453 MB Drive letter or path: G: File system: NTFS Allocation unit size: Default Volume label: New Volume Out-ick format: Yes To close this wizard, click Finish.	
	< Back Finish Cance	el

14. Confirm that the added disks are assigned as the F drive and G drive.

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<u>File</u> <u>Action</u>	<u>V</u> iew <u>H</u> elp								
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/olume	Layout	Туре	File System	Status	Capacity	Free Spa	% Free		
🗰 (C:)	Simple	Basic	NTFS	Healthy (S	127.00 GB	111.94 GB	88 %		
- (F:)	Simple	Basic	RAW	Healthy (P	1.00 GB	1.00 GB	100 %		
New Volume	(G:) Simple	Basic	NTFS	Healthy (P	19.00 GB	18.94 GB	100 %		
Temporary St	torag Simple	Basic	NTFS	Healthy (P	70.00 GB	68.77 GB	98 %		
Disk 0 Basic	(C:)		///////////////////////////////////////					/////	////
121100 00	(127.00 GB NTFS Healthy (Syster		ve, Crash Dump	, Primary Partition					
127.00 GB Online Disk 1 Basic 70.00 GB Online		n, Boot, Activ prage (D:)		Primary Partition					
Disk 1 Basic 70.00 GB	Healthy (Syster Temporary Sto 70.00 GB NTFS	n, Boot, Activ prage (D:)		Primary Partition					
Doline Disk 1 Basic 70.00 GB Online	Healthy (Syster Temporary Sto 70.00 GB NTFS	n, Boot, Activ orage (D:) File, Primary I	Partition)	Primary Partition Primary Partition lew Volume (G:) 9.00 GB NTFS lealthy (Primary P					
Disk 1 Basic 70.00 GB Online Disk 2 Basic 20.00 GB Online	Healthy (Syster Temporary Ste 70.00 GB NTFS Healthy (Page I (F:) 1.00 GB RAW	n, Boot, Activ prage (D:) File, Primary I	Partition)	lew Volume (G:) 9.00 GB NTFS					

8) Adjusting the OS startup time, checking the network setting, checking the firewall setting, synchronizing the server time, and disabling the power saving function. For each procedure, see "Settings after configuring hardware" in Chapter 1, "Determining a system configuration" in the Installation and Configuration Guide.

9) Installing the Azure CLI

Install the Azure CLI.

The procedure to install the Azure CLI from the installer is described. For details about this procedure and other procedures, see the following website: Install Azure CLI 2.0: https://docs.microsoft.com/en-us/cli/azure/install-azure-cli?view=azure-cli-latest

Log in to the created node-1 and node-2 and install the Azure CLI following the procedure below.

- 1. Download the CLI installer from the above website.
- 2. Double-click the CLI installer file and click **Run**.
- 3. Agree with the license terms and click **Install**.

Microsoft Azure	MICROSOFT SOFTWARE LICENSE TERMS	^
	Microsoft CLI 2.0 for Azure	
	These license terms are an agreement between Microsoft Corporation (or based on where you live, one of its affiliates) and you. They apply to the software named above. The terms also apply to any Microsoft services or updates for the software, except to the extent those have different terms.	
	TE YOU COMPLY WITH THESE LICENSE	~
	I accept the terms in the License Agreement	

4. When the installation complete window is displayed, click **Finish**.

No Microsoft CEI 2.0 for Azure 5	
Microsoft Azure	Completed the Microsoft CLI 2.0 for Azure Setup Wizard
	Click the Finish button to exit the Setup Wizard.
	Back Einish Cancel

```
10) Creating a service principal
  Create a service principal using the Azure CLI.
  A script for Azure DNS performs login to Microsoft Azure and DNS zone registration and
  monitoring. When logging in to Microsoft Azure, Azure login with a service principal is used.
  For details about a service principal and procedure, see the following websites:
  Log in with Azure CLI 2.0:
  https://docs.microsoft.com/en-us/azure/xplat-cli-connect
  Create an Azure service principal with Azure CLI 2.0:
  https://docs.microsoft.com/en-us/cli/azure/create-an-azure-service-principal-azure-
  cli?view=azure-cli-latest
     Log in with an organizational account.
  1.
      az login -u <account-name> -p <password>
     Create and register a service principal. Write down the displayed name and tenant because
  2.
      it is necessary to set them in the Azure environment configuration file. In the following
      example, a service principal is created in C:\Users\testlogin\examplecert.pem.
      az ad sp create-for-rbac --create-cert
      {
        "appId": "xxxxxxxx-xxxx-xxxx-xxxx-xxxxx,",
        "displayName": "azure-test",
        "fileWithCertAndPrivateKey": "C:\\Users\\testlogin\\examplecert.
        pem",
        "name": "http://azure-test",
        "password": null,
        3. Log out.
      az logout --u <account-name>
  4. Check whether login to Microsoft Azure using the created service principal is possible.
      az login --service-principal -u <name-value-in-step-2> --tenant
      <tenant-value-in-step-2> -p <fileWithCertAndPrivateKey-value-in-
      step-2>
      The following is displayed upon successful sign-in.
      [
        {
          "cloudName": "AzureCloud",
          "id": "xxxxxxxx-xxxx-xxxx-xxxx-xxxxx,",
          "isDefault": true,
          "state": "Enabled",
          "tenantId": "xxxxxxxx-xxxx-xxxx-xxxx-xxxxx,",
          "user": {
            "name": "http://azure-test",
            "type": "servicePrincipal"
          }
        }
      1
  5.
     Log out.
      az logout --username <name-value-in-step-4>
```

When changing the role of the created service principal from the default "Contributor" to another role, select a role that has access permissions to all of the following operations as the Actions properties. If the role is changed to a role that does not satisfy this condition, monitoring by the Azure DNS monitor resource, which are set up later, fails due to an error.

For the Azure CLI 2.0 Microsoft.Network/dnsZones/A/write Microsoft.Network/dnsZones/A/delete Microsoft.Network/dnsZones/NS/read

11) Installing EXPRESSCLUSTER For the installation procedure, see the *Installation and Configuration Guide*. After installation is complete, restart the OS.

12) Registering the EXPRESSCLUSER license

For the license registration procedure, see the Installation and Configuration Guide.

3.3 Configuring the EXPRESSCLUSTER settings

Configure the following on the WebManager cluster generation wizard. For the WebManager setup and connection procedures, see Chapter 5, "Creating the cluster configuration data" in the *Installation and Configuration Guide*.

This section describes the procedure to add the following resources and monitor resources:

- Mirror disk resource
 - Azure DNS resource
 - Azure DNS monitor resource
 - Custom monitor resource (for NP resolution)
 - IP monitor resource (for NP resolution)
 - Multi target monitor resource (for NP resolution)

or the settings of other resources and monitor resources, see the *Installation and Configuration Guide* and the *Reference Guide*.

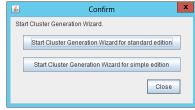
1) Creating a cluster

Start the cluster generation wizard to create a cluster.

- Creating a cluster
 - 1. Access WebManager. Then, the following dialog box is displayed. Click **Start cluster generation wizard**.

\$	Confirm	
The clust	er is not constructed.	
	Start cluster generation wizard.	
	Import cluster configration file.	
	Close	

- 2. The following dialog box is displayed.
 - Click Start Cluster Generation Wizard for standard edition.



3. The **Cluster Definition** page is displayed. Enter a desired name in **Cluster Name**.

Select an appropriate language in **Language**. After the setting is applied, the display language of WebManager is changed to the selected language.

<u>*</u>	Cluste	er Generation Wizard			x
Steps	Cluster Definition				
	Cluster Na <u>m</u> e Clu	uster1			
Server	<u>C</u> omment				
Basic Settings	Language En	glish			-
Interconnect	Management IP Address	-			
NP Resolution	management in Address				
Group Monitor					
wontor					
	Description				
	Start generating the cluster.				
	Enter the cluster name, and then	select the language (locale) of the environment that ru er to manage multiple clusters, specify a unique clust			ter
	The management IP address is a	floating IP address used for a WebManager connections, the management IP address can be omitted.			
	To continue, click [Next].	, de management r address can be omitted.			
			< <u>B</u> ack	<u>N</u> ext >	Cancel

4. The Server Definition page is displayed.

The instance connected to WebManager is displayed as a registered master server. Click **Add** to add the remaining instances (by specifying the private IP address of each instance).

Add Server X
Server Name or IP Address:
10.5.0.121
Description Enter an IP address or a server name. When entering a server name, name resolution is necessary. Both IPv4 and IPv6 for IP address can be used. When entering an IP address, the server name is automatically acquired.
OK Cancel

5. Click Next.

<u>s</u>	Cluster Generation Wizard	x
Steps	Server Definition	
	Server Definition List	
✓ Cluster	Order Name Master Server node-1	Add
🖙 Server	1 node-2	<u>R</u> emove
🕏 Basic Settings		
Interconnect		
NP Resolution		
Group		
Monitor		
		Up
		D <u>o</u> wn
	Server Group	
	Server Group Definition	Settings
	Description	
	Click "Add" to add servers constructing the cluster.	
	Click "Up" or "Down" to change the server priority.	
	Click "Settings" to configure the server group when using the server group.	
	< Back	Vext > Cancel

6. The **Interconnect** page is displayed.

Specify the IP addresses (IP address of each instance) to be used for interconnect. In addition, select mdc1 for **MDC** as a communication path of a mirror disk resource to be created later.

<u>\$</u>			Clu	ster Gen	eration	Wizard				
Steps		terconne								
✓ Cluster	I	nterconn Priority	ect <u>L</u> ist Type	M	DC	node-1		node-2		Add
				mdc1		10.5.0.120	•	10.5.0.121	3	Remove
✓ Basic Settings										Kennove
⇒ Interconnect										
NP Resolution										
Group										
Monitor										
										Up
		4				III			•	D <u>o</u> wn
	D	escriptio	1							
								d" to add interconnect and		
			I mode" setting, con which is used only fo				at. For "I	lirror Communication Only	/" set	ing, configur
		or "Kerne commer		e than zer	o routes :	are necessary to be co	nfigure	d. Configuring more than o	ne ro	utes is
	C	lick each	server column cell t			esses for each commu				
	S	ervers. Fe	or the communicatio	n route wh	ich is us	ed for data mirroring co		the communication amor cation, select the mirror di		
	b	e allocate	ed to the communica	tion route	in MDC c	olumn.				
								< Back N	ext >	Cance

7. Click Next.

8. The **NP Resolution** page is displayed. Note that NP resolution is not configured on this page. The equivalent feature is achieved by adding the IP monitor resource, custom monitor resource, and multi-target monitor resource. Configure NP resolution in "3)Adding a monitor resource" Click Next.

4	Cluster Generation Wizard	x
Steps	NP Resolution	
✓ Cluster	NP Resolution List Type Ping Target node-1 node-2	Add
👇 Server		Remove
Basic Settings		Properties
V Interconnect		
NP Resolution		
Group		
Monitor		
		Tuning
	Description	
	Configure network partition (NP) resolution function.	
	Click "Add" to add NP resolution resource and select the type.	
	For "COM" setting, click each server column cell to configure COM port. For "DISK" setting, click each server column cell to configure driver letter of the partition for disk heartbeat.	
	For "Ping" setting, click Ping target column cell to configure IP address of Ping destination, and then click eac cell to configure "Use" or "Do not use".	h server column
	For "Majority" setting, double-click each server column cell to configure "Use" or "Do not use".	
	For "DISK" and "Ping" settings, the detailed settings can be verified and changed by clicking "Properties". Click "Tuning" to configure the actions at NP occurrence.	
	< Back Next	t> Cancel
		Jancer

2) Adding a group resource

Defining a group

Create a failover group.

1. The **Group List** window s displayed.

<u>\$</u>	Cluster Generation Wizard
Steps	Group
🛩 Cluster	Group List Name Type Add
♥ Server	Remove
Basic Settings	Properties
✓ Interconnect	
✓ NP Resolution Group	<u>Group Resource</u>
Monitor	
	Description
	Configure failover group to be a unit of fail over. Click "Add" to add a group.
	Click "Properties" to configure the properties of the selected group. Click "Group Resource" to add resource to the selected group.
	< <u>B</u> ack <u>N</u> ext> Cancel

2. The **Group Definition** window is displayed. Specify a failover group name (failover1) for **Name**.

\$		Group Definition
Steps	Group Definition	
✓ Cluster	<u>T</u> ype	failover
🛩 Server		Use Server <u>G</u> roup Settings
🕒 Group	Na <u>m</u> e	failover1
🗟 Basic Settings	<u>C</u> omment	
Startup Servers		
Group Attributes		
Group Resources		
Monitor		
	Description	
	Select group type. If using virtual machi	ne resources to cluster virtual machines, select "Virtual machine" as the type. In other cases, select
	"Failover".	, check the "Use Server Group".
		< <u>B</u> ack <u>N</u> ext> Cancel
Click Next		

3. Click Next.

4. The **Servers that can run the Group** page is displayed. Click **Next** without specifying anything.

<u></u>	Group Definition(failover1)
Steps	Servers that can run the Group
🛩 Cluster	Failover is possible on all servers Servers that can run the Group Ayailable Servers
💙 Server	Servers Servers
눡 Group	node-2
✓ Basic Settings	< A <u>d</u> d
🕏 Startup Servers	<u>R</u> emove >
Group Attributes	
Group Resources	
Monitor	Down
	Select the server which can run the group and configure the priority of the servers. In case that all the servers which are registered to the cluster can start the group, check "Failover is possible at all servers" on. The priority order is the order which was set when the server was registered to the cluster. In case setting individually the server which can start the group, check "Failover is possible at all servers" off. Select the server which can start the group from the "Available Servers" list on the right side, and click "Add" to add the server to "Servers that can run the Group" list. Click "Up" or "Down" to change the priority order.
	<back next=""> Cancel</back>

5. The **Group Attribute Settings** page is displayed. Click **Next** without specifying anything.

<u>&</u>	Group Definition(failover1)	x
Steps	Group Attribute Settings	
	Startup Attribute	
🛩 Cluster	Auto Startup O Manual Startup	
✓ Server	Failover Attribute	
🕂 Group	Auto Eailover	
	Use the startup server settings Failover dynamically Edit exclusion	monitor
🤟 Basic Settings	Perform a Forced Failover	monitor
🛩 Startup Servers	Prioritize failover policy in the server group	
🕏 Group Attributes	Perform a Smart Failover	
	O Prioritize failover policy in the server group	
Group Resources	Enable only manual failover among the server groups	
Monitor	O Manual Failover	
	Failback Attribute	
	Description	
	Configure starting failover group or actions of fail over. In case not automatically starting the group at cluster startup, set "Startup Attribute" to "Manual Startup". In case selecting the fail over destination considering the status of the monitor resource of each server at failure or select "Failover dynamically" in "Auto failover". In case failover using the server group settings and prioritizing the so the same server group, select "Prioritize the failover policy inside the server group".	
	Eack Next>	Cancel

- On this page, add a group resource following the procedure below. Group Definition(failover1) Group Resource Steps Group Resource List 🛩 Cluster Name Туре A<u>d</u>d 🛩 Server <u>R</u>emove 눡 Group Properties ✓ Basic Settings ✓ Startup Servers 🛩 Group Attributes 🚽 Group Resources Monitor Description Click "Add" to add resources. Click "Properties" to configure the properties of the selected resource < Back Finish Cancel
- 6. The **Group Resource** page is displayed.

Mirror disk resource

Create a mirror disk resource.

For details, see "Understanding mirror disk resources" in Chapter 5, "Group resource details" in the *Reference Guide*.

- 1. Click Add on the Group Resource List page.
- The Resource Definition of Group window is displayed. Select the group resource type (mirror disk resource) from the Type box and enter the group name (md) in the Name box.

				ition of Group(failover1)	Resource Defini			<u>\$</u>
					Definitions	Group Resource		Steps
				 				Cluster
•				esource	mirror disk re	<u>T</u> ype		Server
					md	Na <u>m</u> e		Group
						<u>C</u> omment	Settings	🤟 Basic Set
Licence Info	Get <u>L</u> icer						Servers	🤟 Startup S
							Attributes	🤟 Group At
							Resources	👇 Group Re
								😒 Info
							endency	
							overy Operation	
						Description	ails	Detail
					6			Monitor
				enter its name.	f group resource and	Select the type o		
> Cance	Next >	ack	< <u>B</u> ack					
>	<u>N</u> ext >	ick	< <u>B</u> ack					

3. Click Next.

4. The **Dependent Resources** page is displayed.

<u>\$</u>		Resource	Definition of Group(failover1)			X
Steps	✓ Eollow th	ie default depende	ency			
🛩 Cluster	D <u>e</u> pendent F Name	Resources Resource type		< Add	Nan	Available Resources
♥ Server				Remove :	_	
➡ Group ✓ Basic Settings						
V Startup Servers						
💙 Group Attributes						
Group Resources						
Dependency						
Recovery Operation						
Details						
Monitor						
					< <u>B</u> ack	Next > Cancel

 The Recovery Operation at Activity Failure Detection and Recovery Operation at Deactivity Failure Detection page is displayed. Click Next.

<u></u>		Resource Definition of Group(failover1)	x
Steps	Execute Script be	fore or after Activation or Deactivation	Settings
🛩 Cluster	Recovery Operati	on at Activity Failure Detection	
🛩 Server	Retry Count		3 time
눡 Group	Failover Target S	erver	
✓ Basic Settings	Stable	Server O Maximum Priority Server	ver
🛩 Startup Servers	Failover <u>T</u> hresho	ld	1 time
🤟 Group Attributes	Einal Action	No operation (not activate next resource)	▼
👇 Group Resources	Execute Scri	pt before Final Action	Settings
💙 Info	Recovery Operati	on at Deactivity Failure Detection	
💙 Dependency	Retry Count at D	eactivation Failure	0 time
🔿 Recovery Operation	Final Acti <u>o</u> n	Stop the cluster service and shutdown OS	▼
Details	Exe <u>c</u> ute Scrij	ot before Final Action	Settings
Monitor			
		<	Back Next > Cancel

- 6. The **Details** page is displayed.
 - Select a server name in the **Name** column of **Servers that can run the group** and click **Add**.

<u>\$</u>	Resource Definition of Group(failo	ver1)	x
Steps	Mirr <u>o</u> r Disk No.	1	-
🛩 Cluster	Data Partition Drive Letter		
🛩 Server	Cluster Partition Drive Letter		
🕂 Group	Cluster Partition Offset Index	0	-
✓ Basic Settings	- Mirror Disk Connect		lect
🤟 Startup Servers			oci
Group Attributes	Servers that can run the group		
👇 Group Resources	Name Data Partition Cluster Partition	Add Name node-1	
🛩 Info		Remove > node-2	
Dependency			
Recovery Operation			
😪 Details			
Monitor			
		Edit	
			ning
		< Back Finish Ca	ancel

7. The Selection of partition dialog box is displayed. Click Connect, select the data partition and cluster partition created in "7)Configuring virtual machines", and click OK.

		Selection o	f partition		x	
Partition						
Data Partitio	n				Obtain inform	
Volume	Disk No.	Partition No.	Size	GU	Connect	
	0	1	500MB		Connect	
D:\	1	1	71677MB			
F:\	2	1	1024MB			
C:\	0	2	40458MB			
G:\	2	2	19453MB			
•				•		
	-					
Cluster Parti	tion					
Volume	Disk No.	Partition No.	Size	GU		
	0	1	500MB			
D:\	1	1	71677MB			
FΆ	2	1	1024MB			
C:\	0	2	40458MB			
G:\	2	2	19453MB	and the second se		
•				•		
GUID						
00.0						
OK Cancel						

8. Perform steps 6 and 7 for node-1 and then node-2 and click **Finish**.

<u></u>	Resource Definition of Group(fa	ilover1)
Steps	Mirr <u>o</u> r Disk No.	1
🛩 Cluster	Data Partition Drive Letter	G:
🛩 Server	<u>Cluster Partition Drive Letter</u>	F:
Group	Cl <u>u</u> ster Partition Offset Index	0
 Basic Settings Startup Servers 	Mirror Disk Connect	Select
✓ Group Attributes	Servers that can run the group	
🖙 Group Resources	Name Data Partition Cluster Partition	< Add Name
🛩 Info	node-2	<u>R</u> emove >
Dependency		
Recovery Operation		
宁 Details		
Monitor		
		Edit
		Iuning
		< Back Finish Cancel

• Azure DNS resource

Provides a mechanism to register or unregister a record to or from Azure DNS.

For details about the Azure DNS resource, see "Understanding Azure DNS resources" in Chapter 5, "Monitor resource details" in the *Reference Guide*.

- 1. Click Add on the Group Resource List page.
- 2. The **Resource Definition of Group** window is displayed. Select the group resource type (Azure DNS resource) from the **Type** box and enter the group name (azuredns1) in the **Name** box.

<u>\$</u>	R	esource Definition of Group(failover1)	
Steps	Group Resource Defi	nitions	
🛩 Cluster			
🛩 Server	<u>T</u> ype	Azure DNS resource	
🕂 Group	Na <u>m</u> e	azuredns1	
✓ Basic Settings	Comment		
💙 Startup Servers			Get Licence Info
💙 Group Attributes			_
👇 Group Resources			
😒 Info			
Dependency			
Recovery Operation			
Details			
Monitor	Description		
	Select the type of gro	up resource and enter its name.	
			<back next=""> Cance</back>

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4. The Dependent Resources page is displayed. Click Next without specifying anything.

S	Resource Definition of Group(failover1)	X
Steps	✓ Follow the default dependency	
✓ Cluster	Dependent Resources	Available Resources
🛩 Server	Name Resource type Add Name	
🖵 Group	<u>R</u> emove >	
✓ Basic Settings		
🛩 Startup Servers		
🛩 Group Attributes		
눡 Group Resources		
💙 Info		
🔿 Dependency		
Recovery Operation		
Details		
Monitor		
	<pre></pre>	Next > Cancel

5. The Recovery Operation at Activity Failure Detection and Recovery Operation at Deactivity Failure Detection page is displayed. Click Next.

<u>چ</u>		Resource Definition of Group(failover1)		×
Steps	Execute Script be	fore or after Activation or Deactivation	Sett	ijngs
🛩 Cluster	Recovery Operation	on at Activity Failure Detection		
🛩 Server	Retry Count	Retry Count 1 time		
🕂 Group	Failover Target S	erver		
💙 Basic Settings	Stable	Server O Maximum Price	ority Server	
🤟 Startup Servers	Failover <u>T</u> hresho	d		1 time
🤟 Group Attributes	Einal Action	No operation (not activate next resource)		-
🕒 Group Resources	Execute Scrip	t before Final Action	Sett	ings
💙 Info	Recovery Operation	on at Deactivity Failure Detection		
💙 Dependency	Retry Count at De	activation Failure	1	0 time
😪 Recovery Operation	Final Acti <u>o</u> n	Stop the cluster service and shutdown OS		-
Details	Exe <u>c</u> ute Scrip	t before Final Action	Sett	in <u>q</u> s
Monitor				
			< Back Next >	Cancel

6. Enter the values for each of the following: Record Set Name, Zone Name, IP Address, Resource Group Name, User URI, Tenant ID, File Path of Service Principal, Azure CLI File Path. When using the IP address of each server, enter the IP address in the tab for each server. When setting up the servers separately, enter any IP address of the servers in the Common tab and then make settings for other servers.

<u>\$</u>	Resource	e Definition of	Group(failover1)	x
Steps	Common 🗃 node-1	🗃 node-2		
✓ Cluster	Record Set Name	test-record1		
✓ Server ⇒ Group	Zone Name	cluster1.zone		
✓ Basic Settings	IP Address	10.5.0.120		
💙 Startup Servers				
🤟 Group Attributes	TTL	3600	sec	
🕂 Group Resources	Resource <u>G</u> roup Name	TestGroup1		
💙 Info	Account			
💙 Dependency	<u>U</u> ser URI		http://azure-test	
Recovery Operation	T <u>e</u> nant ID		X00000000-X0000-X0000-X0000-X0000000000	
😴 Details	File Path of Service Princip	al	C:\Users\testlogin\examplecert.pem	
Monitor	Azure CLI <u>F</u> ile Path		C:\Program Files (x86)\Microsoft SDKs\Azure\CLI2\wbin\az.cmd	
	☑ Delete a record set at dea	activation		
			Iuning	
			< Back Finish Cancel	
Click Finich				

7. Click Finish.

3) Adding a monitor resource

• Azure DNS monitor resource

The mechanism to check the record sets registered to the Azure DNS and whether the name resolution is available is provided.

For details about Azure DNS monitor resources, see "*Reference Guide*" > "Chapter 6, Monitor resource details" > "Understanding Azure DNS monitor resources."

Adding one Azure DNS resource creates one Azure DNS monitor resource automatically.

Custom monitor resource

Sets a script to monitor whether communication with Microsoft Azure Service Management API is possible, and also monitors health of communication with an external network.

For details about the custom monitor resource, see "Understanding custom monitor resources" in Chapter 6, "Monitor resource details" in the *Reference Guide*.

<u>\$</u>	Cluster Gen	eration Wizard	X
Steps	Monitor Resource		
	Monitor Resource List		
🛩 Cluster	Name	Туре	Add
	azurednsw1	Azure DNS monitor	
🤟 Server	mdnw1	mirror connect monitor	Remove
A Desis Asttinus	mdw1	mirror disk monitor	
Basic Settings	userw	user mode monitor	Properties
✓ Interconnect			
V NP Resolution			
✓ Group			
Gloup			
	Description		
	Click "Add" to add monitor resource. Click "Property" to configure the propertie Click "Finish" to complete creating a clus	s of the selected monitor resource. ter.	
			< Back Finish Cancel

1. Click Add on the Monitor Resource List page.

2. Select the monitor resource type (custom monitor) from the **Type** box and enter the monitor resource name (genw1) in the **Name** box.

\$		Monitor Resource Definition	X
Steps	Monitor Resource Defini	tion	
 Steps Cluster Server Group Monitor Info Monitor(common) Monitor(special) Recovery Action 	Iype Na <u>m</u> e <u>C</u> omment	custom monitor genw1	▼ Get Licence Info
	Description Select the type of monito	or resource and enter its name.	
			< <u>Back</u> <u>N</u> ext > Cancel

- 3. Click Next.
- 4. The Monitor (common) page is displayed. Confirm that Monitor Timing is Always and click Next.

<u>گ</u>	Monitor Resource Definition	X
Steps	Interval	60 sec
✓ Cluster	Imeout	120 sec
✓ Server	Do Not Retry at Timeout Occurrence	
🛩 Group	Do Not Execute Recovery Action at Timeout Occurrence Retry Count	1 time
🕂 Monitor	Wait Time to Start Monitoring	3 sec
✔ Info		
😒 Monitor(common)	Monitor Timing	
Monitor(special)	Always Alw	
Recovery Action		
	Target Resource	Bro <u>w</u> se
	Choose servers that execute monitoring	Server
		001201
	< Back Nex	t > Cancel

5. The **Monitor (special)** page is displayed. Select **Script created with this product**.

The following shows the sample of a script to be created.

< *EXPRESSCLUSTER_installation_path*>\bin\clpazure_port_checker -h management.core.windows.net -p 443 EXIT %ERRORLEVEL%

Select Synchronous for Monitor Type.

<u>&</u>	I	Monitor Resource Definition	×
Steps	O User Application		
🛩 Cluster	Script created with this	product	
🛩 Server	<u>F</u> ile	genw.bat	
🛩 Group			View Edit Replace
눡 Monitor	Monitor Type		
🛩 Info	Synchronous		Asynchronous
Monitor(common)	Normal Return Value	0	
🖈 Monitor(special)	Kill the application whe		
Recovery Action	Kill the application whe	en exit	
			Viewer/Editor tool can be changed
			< Back Next > Cancel

6. Click Next.

7. The **Recovery Action** page is displayed.

Select Execute only the final action for Recovery Action, LocalServer for Recovery Target, and No operation for Final action.

<u>\$</u>		Monitor Resource Definition	X
Steps	Recovery Action	Execute only the final action	▼
🛩 Cluster	Recovery Target	LocalServer	Browse
🛩 Server	Recovery Script Exe	cution Count	0 time
🛩 Group			
🖰 Monitor			
🛩 Info	Execute Script be	fore Reactivation	
Monitor(common)	Maximum <u>R</u> eactivat	on Count	0 time
✓ Monitor(special)	L		
Recovery Action	Execute Script be	– n before Failover	O Maximum Priority Server
	Maximum Failover (count	0 time
	Execute Script be		
	Einal Action	No operation	
			Script Settings
			< <u>B</u> ack Finish Cancel

8. Click **Finish** to finish setting.

• IP monitor resource

Creates an IP monitor resource to monitor communication between clusters that are configured with virtual machines, and also to monitor whether communication with an internal network is health.

For details about the IP monitor resource, see "Understanding IP monitor resources" in Chapter 6, "Monitor resource details" in the *Reference Guide*.

- 1. Click Add on the Monitor Resource List page.
- 2. Select the monitor resource type (ip monitor) from the **Type** box and enter the monitor resource name (ipw1) in the **Name** box.

<u>\$</u>		Monitor Resource Definition		x
Steps	Monitor Resource Defin	nition		
🛩 Cluster				
✓ Server	<u>T</u> ype	ip monitor		-
🛩 Group	Na <u>m</u> e	ipw1		
🕒 Monitor	<u>C</u> omment			
🕏 Info			Ge	t <u>L</u> icence Info
Monitor(common)				
Monitor(special)				
Recovery Action				
	Description			
		tor resource and enter its name.		
			< <u>B</u> ack <u>N</u> ext	> Cancel

3. Click Next.

4. The **Monitor (common)** page is displayed. Confirm that **Monitor Timing** is **Always**.

<u>ه</u>	Monitor Resource Definition
Steps	Interval 60 sec
✓ Cluster✓ Server	Imeout 60 sec ☐ Do Not Retry at Timeout Occurrence
 Server ✓ Group ➡ Monitor 	Dg Not Execute Recovery Action at Timeout Occurrence Betry Count Wait Time to Start Monitoring 0 sec
 ✓ Info ➡ Monitor(common) Monitor(special) Recovery Action 	Monitor Timing Always Agtive Target Resource Browse
	Choose servers that execute monitoring Server
	< <u>Back</u> Next> Cancel

Select one available server for **Choose servers that execute monitoring**.

Failure Detection Server				
⊖ A <u>l</u> l Servers ● Sele <u>c</u> t				
Servers that can run the Group		Available Servers		
Name node-1	< Agd	Name node-2		
<u> </u>	ОК	Cancel	oply	

Click Next

5. The Monitor (special) page is displayed.

<u>\$</u>	Monitor Resource Definition
Steps	
✓ Cluster	JP Addresses
✓ Server	IP Address Add
✓ Group	Remove
	Edit
✓ Info	
Monitor(common)	
字 Monitor(special)	
Recovery Action	
	ping Timeout 5000 msec
	< <u>B</u> ack Next> Cancel

On the **Common** tab, select **Add** of **IP Address** and set an IP address of a server other than the server selected in step 4.

	IP Address Settings	x
Interface		
IP Address	5 [10.5.0.121	
	ОК Сал	cel

6. Click Next.

<u></u>	Monitor Resource Definition		×
Steps			
🛩 Cluster	IP Addresses IP Address		Add
✓ Server	10.5.0.121		Remove
🛩 Group			Edit
🖴 Monitor			Ean
❤ Info			
💙 Monitor(common)			
🖈 Monitor(special)			
Recovery Action			
	ping Timeout	5	5000 msec
		< Back Nex	t> Cancel

- The Recovery Action page is displayed.
 Select Execute only the final action for Recovery Action, LocalServer for Recovery Target, and No operation for Final action.

<u></u>		Monitor Resource Definition	X
Steps	Recovery Action	Execute only the final action	•
🛩 Cluster	Recovery Target	LocalServer	Bro <u>w</u> se
🛩 Server	Recovery Script Execution Count 0 time		
🛩 Group			
🌳 Monitor		\sim	
🛩 Info	Execute Script bef	ore Reactivation	
Monitor(common)	Maximum Reactivation Count		
Monitor(special)			
😪 Recovery Action	Execute Script before Failover Execute migration before Failover Failover Target Server Maximum Priority Server		
	Maximum Failover C	punt	0 time
	Execute Script bef		
	Efectite Script per		
	Einal Action	No operation	•
			Script Settings

- 8. Click **Finish** to finish setting.
- 9. Then, create a monitor resource on the other server. Click Add on the Monitor Resource List page.

10.Select the monitor resource type (ip monitor) from the **Type** box and enter the monitor resource name (ipw2) in the **Name** box.

<u>\$</u>		Monitor Resource Definition		x
Steps	Monitor Resource Defin	ition		
🛩 Cluster				
🛩 Server	<u>T</u> ype	ip monitor		-
🛩 Group	Na <u>m</u> e	ipw2		
🖰 Monitor	Comment			
😔 Info				Get Licence Info
Monitor(common)				
Monitor(special)				
Recovery Action				
	Description			
		or resource and enter its name.		
	Select the type of monit			
			< <u>B</u> ack	Next > Cancel

11. Click Next.

12. The **Monitor (common)** page is displayed. Confirm that **Monitor Timing** is **Always**.

<u><u></u></u>	Monitor Resource Definition	
Steps	Interval	60 sec
Cluster	Iimeout	60 sec
🖉 Server	Do Not Retry at Timeout Occurrence	
Ø Group	Do Not Execute Recovery Action at Timeout Occurrence	
→ Monitor	Retry Count	1 time
✓ Info	Wait Time to <u>S</u> tart Monitoring	0 sec
→ Monitor(common)		
Monitor(special)	Monitor Timing	
Recovery Action	⊖ A <u>c</u> tive	
,	Target Resource	Bro <u>w</u> se
	_	
	Choose servers that execute monitoring	Server
	<back 2<="" next="" td=""><td>Cance</td></back>	Cance
elect one availab		
	ole server for Choose servers that execute monitor	
Failur	ble server for Choose servers that execute monitor	
	ble server for Choose servers that execute monitor	
C All Servers	ble server for Choose servers that execute monitor	
All Servers Selegt Servers that can run the Group Name	Dele server for Choose servers that execute monitor	
Failur All Servers Select Servers that can run the Group	ole server for Choose servers that execute monitor	
All Servers Selegt Servers that can run the Group Name	De server for Choose servers that execute monitor	
All Servers Selegt Servers that can run the Group Name	De server for Choose servers that execute monitor	
All Servers Selegt Servers that can run the Group Name	De server for Choose servers that execute monitor	
All Servers Selegt Servers that can run the Group Name	De server for Choose servers that execute monitor	
All Servers Selegt Servers that can run the Group Name	De server for Choose servers that execute monitor	
All Servers Selegt Servers that can run the Group Name	De server for Choose servers that execute monitor	
All Servers Selegt Servers that can run the Group Name	De server for Choose servers that execute monitor	
All Servers Selegt Servers that can run the Group Name	De server for Choose servers that execute monitor	

Click Next.

<u></u>	Monitor Resource Definition	×
Steps		
✓ Cluster	IP Addresses	Add
✓ Server		Remove
✔ Group		Edit
🕂 Monitor		Eur
❤ Info		
✓ Monitor(common)		
🖈 Monitor(special)		
Recovery Action		
	ping Time <u>o</u> ut	5000 msec
	< <u>B</u> ack	Vext > Cancel

13. The Monitor (special) page is displayed.

On the **Common** tab, select **Add** of **IP Address** and set an IP address of a server other than the server selected in step 12.

	IP Address Settings	x
Interface		
IP Address	10.5.0.120	
	ок	Cancel

14.Click Next.

<u>\$</u>	Monitor Resource Definition		x
Steps			
✓ Cluster	IP Addresses IP Address	Add	1
♥ Server	10.5.0.120	Remove	1
🛩 Group		Edit	1
🕒 Monitor		2	
✔ Info			
✓ Monitor(common)			
🖈 Monitor(special)			
Recovery Action			
	ping Timeout	5000 msec	
		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
	< Back	lext > Canc	el

- 15. The Recovery Action page is displayed. Select Execute only the final action for Recovery Action, LocalServer for Recovery Target, and No operation for Final action.

<u></u>		Monitor Resource Definition	x
Steps	Recovery Action	Execute only the final action	v
✔ Cluster	Recovery Target	LocalServer	Browse
✓ Server	Recover <u>y</u> Script Exe	ecution Count	0 time
🛩 Group			
🖴 Monitor		~	
💙 Info	Execute Script b	efore Reactivation	
Monitor(common)	Maximum <u>R</u> eactiva	tion Count	0 time
🤎 Monitor(special)			
Recovery Action	Execute Script b		
	Failover Target Ser	ver	O Maximum Priority Server
	Maximum Failover	Count	0 time
	Execute Script b	efore Final Action	
	Einal Action	No operation	~
			Script Settings
			< Back Finish Cancel

16. Click Finish to finish setting.

Multi-target monitor resource

Creates a multi-target monitor resource to check the statuses of the custom monitor resource and IP monitor resource. The custom monitor resource monitors communication to Microsoft Azure Service Management API. The IP monitor resource monitors communication between clusters that are configured with virtual machines.

If their statuses are abnormal, execute the script in which the processing for NP resolution is described.

For details about the multi-target monitor resource, see "Understanding multi-target monitor resources" in Chapter 6, "Monitor resource details" in the *Reference Guide*.

- 1. Click Add on the Monitor Resource List page.
- 2. Select the monitor resource type (multi-target monitor) from the **Type** box and enter the monitor resource name (mtw1) in the **Name** box.

<u>\$</u>		Monitor Resource Definition	X
Steps	Monitor Resource Defini	tion	
🗸 Cluster			
✓ Server	<u>T</u> ype	multi-target monitor	•
🛩 Group	Na <u>m</u> e	mtw1	
눡 Monitor	<u>C</u> omment		
😔 Info			Get Licence Info
Monitor(common)			
Monitor(special)			
Recovery Action			
	Description		
	Select the type of monitor	or resource and enter its name.	
			< Back Next > Cancel

- 3. Click Next.
- 4. The **Monitor (common)** page is displayed. Confirm that **Monitor Timing** is **Always** and click **Next**.

<u>\$</u>	Monitor Resource Definition
Steps	Interval 60 sec
✓ Cluster	Timeout 60 sec
✓ Server	Do Not Retry at Timeout Occurrence
✓ Group	Do Not Execute Recovery Action at Timeout Occurrence
-> Monitor	Retry Count 1 time
✓ Info	Wait Time to Start Monitoring 0 sec
→ Monitor(common)	
Monitor(special)	Monitor Timing O Always
Recovery Action	○ A <u>c</u> tive
	Target Resource Browse
	Choose servers that execute monitoring Server
	< <u>Back</u> Next> Cancel

5. The Monitor (special) page is displayed.

From Available Monitor Resources, select the custom monitor resource (genw1) for checking communication with Service Management API and two IP monitor resources (ipw1 and ipw2) that are set to both servers. Then, click Add to add them to Monitor Resource List.

\$	Monitor	Resource Definition			x
Steps	Monitor Resources			A <u>v</u> ailable Monito	r Resources
🛩 Cluster	Monitor Resource Type genw1 genw		< A <u>d</u> d	Monitor Resource userw	Type userw
🛩 Server	ipw1 ipw ipw2 ipw		<u>R</u> emove >		
🛩 Group					
🖙 Monitor					
🛩 Info					
Monitor(common)					
🖙 Monitor(special)					
Recovery Action					
					Tuning
				Back Next >	Cancel
			<		Cancer

- 6. Click Next.
- 7. The Recovery Action page is displayed. Specify Execute only the final action for Recovery Action, LocalServer for Recovery Target, and Stop the cluster service and shutdown OS for Final action.

		Monitor Resource Definition	×
Steps	Recovery Action	Execute only the final action	▼
✓ Cluster	Recovery Target	LocalServer	Browse
✓ Server	Recovery Script Exe	cution Count	0 time
❤ Group			
🕂 Monitor			
💙 Info	Execute Script be	fore Reactivation	
Monitor(common)	Maximum <u>R</u> eactivat	on Count	0 time
🤎 Monitor(special)			
Secovery Action	Execute Script be	n before Failover	○ Maximum <u>Priority</u> Server
	Maximum Failover C	Coun <u>t</u>	0 time
		\bigtriangledown	
	Execute Script be	fore Final Action	
	Einal Action	Stop the cluster service and shutdown OS	•
			Script Settings

8. Click **Finish** to finish setting.

4) Setting the cluster properties

For details about the cluster properties, see "Cluster properties" in Chapter 2, "Functions of the Builder" in the *Reference Guide*.

• Cluster properties

Configure the settings in **Cluster Properties** to link Microsoft Azure and EXPERSSCLUSTER.

1. Enter **Config Mode** from WebManager, right-click a cluster name, and select **Properties**.

\$	[Cluster1] Cluster Properties	x
Alert Log Delay Warning Info Interconnect NP	Disk Mirror Disk Account RIP(Legacy) Migration Extension Resolution Timeout Port No. Monitor Recovery Alert Service WebM	anager
Cluster Na <u>m</u> e	Cluster1	
<u>C</u> omment		
Language	English	-
L	OK Cancel	<u>A</u> pply

2. Select the **Timeout** tab. For **Timeout** of **Heartbeat**, specify a value calculated by "A+B+30" ("Time that the multi-target monitor resource requires to detect an error"+30 seconds).

A: **Interval** of the monitor resource being monitored by the multi-target monitor resource for NP resolution x (**Retry Count**+1)

* Among three monitor resources, select the monitor resource whose calculation result is the largest.

B: Interval of the multi-target monitor resource x (Retry Count+1)

Note: If **Timeout** of **Heartbeat** is shorter than the time that the multi-target monitor resource requires to detect an error, a heartbeat timeout will be detected before starting the NP resolution processing. In this case, the same service may start doubly in the cluster because the service also starts on the standby server.

Solution [Cluster 1] Cluster Properties	
Alert Log Delay Warning Disk Mirror Disk Account RIP(Legacy) Migration	Extension
Info Interconnect NP Resolution Timeout Port No. Monitor Recovery	Alert Service WebManager
Network initialization complete wait time	3 min
Server Sync Wait Time	5 min
_ Heartbeat	
I <u>n</u> terval	3 sec
Timeout	270 sec
Server Internal Timeout	180 sec
	Initialize
	OK Cancel Apply

3. Click OK.

- 5) Applying the settings and starting the cluster
 - After all settings are complete, click the icon to apply the settings under the menu. 1. - 0 X

http://10.5.0.120:29003/main.ht	tm			2
Eile View Edit Help				
🖼 Config Mode 🛛 💌 📾	2 %			_
Tuber Servers Image: Servers Image: Servers	Name Severs Groups Monitors			
Type Received Time	Time 👽	Server Name Module Na	ame Event ID	
•	1			Þ
la The dialog bo	ox to confirm to	o restart the r	manager	r is disp
		o restart the r		r is disp
<u>\$</u>	x to confirm to Cluster Builder			r is disp
Apply the changes.		x		r is disp
Apply the changes.	Cluster Builder	x		r is disp
Apply the changes. To apply the changes, the	Cluster Builder	x		r is disp
Apply the changes. To apply the changes, the Restart the manager	Cluster Builder	x		r is disp
Apply the changes. To apply the changes, the Restart the manager	Cluster Builder	X		r is disp
Apply the changes. To apply the changes, the Restart the manager Do you want to perform th	Cluster Builder	performed.		r is disp
Apply the changes. To apply the changes, the Restart the manager	Cluster Builder	X		r is disp
Apply the changes. To apply the changes, the Restart the manager Do you want to perform th Select IP	Cluster Builder	performed.		r is disp
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Apply the changes. To apply the changes, the Restart the manager Do you want to perform the Select IP Click OK . Click OK aga	Cluster Builder following operations must be e operations? OK in on the follow	performed.		r is disp
Apply the changes. To apply the changes, the Restart the manager Do you want to perform th Select IP Click OK. Click OK aga	Cluster Builder following operations must be e operations? OK in on the follow uilder	performed.		r is disp
Apply the changes. To apply the changes, the Restart the manager Do you want to perform th Select IP Click OK. Click OK aga Cluster Bu	Cluster Builder following operations must be e operations? ok in on the follow uilder	performed.		r is disp
Apply the changes. To apply the changes, the Restart the manager Do you want to perform the Select IP Click OK. Click OK aga Cluster Bu	Cluster Builder following operations must be e operations? OK in on the follow uilder inished successfully. Manager.	performed.		r is disp
Apply the changes. To apply the changes, the Restart the manager Do you want to perform th Select IP Click OK. Click OK aga Cluster B The application fi Restart the Webb	Cluster Builder following operations must be e operations? OK in on the follow uilder inished successfully. Manager.	performed.		r is disp

5. uster from the Service menu.

6		Cluste	r Manager - Wind	lows Internet E	xplorer		_ D X	
Ø http://10	0.5.0.120:29003/main.h	ntm						2
<u>F</u> ile ⊻iew	Service Tool He	lp						
🙆 Operatio	Suspend Cluster	i 🗘 🖗 🔅 🖉						
A Stopped	Resume Cluster							-
2 Stopped	Start Cluster							
	Stop Cluster							
	Restart <u>M</u> anager							
A T								
Туре	Received Time		Time 🔻	Server Name	Module Name	Event ID		
•								Þ

3.4 Verifying the created environment

Verify whether the created environment works properly by generating a monitoring error to fail over a failover group.

If the cluster is running normally, the verification procedure is as follows:

- 1. Start the failover group (failover1) on the active node (node-1). In the Status tab on the Cluster WebUI, confirm that **Group Status** of failover1 of node-1 is **Normal**.
- 2. Log in to the Microsoft Azure portal, select cluster1.zone on the **DNS zone** blade, and then select **Summary**. Check the DNS servers displayed on the upper right of the window (name server 1, name server 2, name server 3, and name server 4 in the window example).
- Confirm that the relevant record set exists in the DNS servers checked in the above step by executing the nslookup command as follows: nslookup test-record1.cluster1.zone < DNS servers checked in the above step>
- On the Microsoft Azure portal, delete an A record from the DNS zone. This causes azurednsw1 to detect a monitoring error. On the DNS zone blade, select cluster1.zone and then Summary.
- 5. Select the record you want to delete and click **Delete**. When the deletion confirmation dialog box is displayed, select **Yes**.
- 6. When the time specified for **Interval** of azurednsw1 elapses, the failover group (failover1) enters an error status and fails over to node-2. In the Status tab on the Cluster WebUI, confirm that **Group Status** of failover1 of node2 is **Normal**.
- 7. Confirm that the relevant record set exists in the DNS servers checked in the above step by executing the nslookup command as follows:

nslookup test-record1.cluster1.zone *<DNS_servers_checked_in_the_above_step>* Verifying the failover operation when an A record is deleted from the DNS server is now complete. Verify the operations in case of other failures if necessary.

Chapter 4 Cluster Creation Procedure (for an HA Cluster Using an Internet Facing Load Balancer)

4.1 Creation example

This guide introduces the procedure for creating a 2-node unidirectional standby cluster using EXPRESSCLUSTER on Microsoft Azure. This procedure is intended to create a mirror disk type configuration in which node-1 is used as an active server.

The following tables describe the parameters that do not have a default value and the parameters whose values are to be changed from the default values.

Setting item	Setting value
Resource group setting	
Name	TestGroup1
Resource group location	Japan East
Virtual network setting	
Name	Vnet1
Address space	10.5.0.0/24
Subnet name	Vnet1-1
Subnet address range	10.5.0.0/24
Resource group name	TestGroup1
Location	Japan East
Load balancer setting	
Name	TestLoadBalancer
Туре	Public
Public IP address: Name	TestLoadBalancerPublicIP
Public IP address:	Static
Assignment	
Resource group	TestGroup1
Location	Japan East
Backend pool: Name	TestBackendPool
Associated to	Availability set
Target virtual machine	node-1
	node-2
Network IP configuration	10.5.0.120
	10.5.0.121
Health probe: Name	TestHealthProbe
Health probe: Port	26001
Load balancing rule: Name	TestLoadBalancingRule
Load balancing rule: Port	80 (Port number offering the operation)
Load balancing rule:	8080 (Port number offering the operation)
Backend port	
Inbound security rule setting	g
Name	TestHTTP
Protocol	ТСР
Port range	8080 (Port number offering the operation)

• Microsoft Azure settings (common to node-1 and node-2)

Setting item	Set	tting value
	node-1	node-2
Virtual machine setting		
VM disk type	HDD	
User name	testlogin	
Password	PassWord_123	
Resource group name	TestGroup1	
Location	Japan East	
Storage account setting		
Name	clstorageacc1	
Performance	Standard	
Replication	Locally-redundant storage (L	_RS)
Network security group se		
Name	NetSecGroup-1	
Availability set setting		
Name	AvailabilitySet-1	
Update domains	5	
Fault domains	3	
Diagnostics storage accor	unt setting	
Name	clstorageaccdiag1	
Performance	Standard	
Replication	Locally-redundant storage (L	_RS)
IP configuration setting		
IP address	10.5.0.120	10.5.0.121
Blob storage setting		
Name	Node-1Blob1	Node-2Blob1
Source type	New (empty disk)	
Account type	Standard (HDD)	
Size	20	

• Microsoft Azure settings (specific to each of node-1 and node-2)

• EXPRESSCLUSTER settings (cluster properties)

Setting item	Settin	g value
	node-1	node-2
Cluster Name	Cluster1	
Server Name	node-1	node-2
Timeout Tab: Heartbeat	210	
timeout		

• EXPRESSCLUSTER settings (failover group)

Resource name	Setting item	Setting value
Mirror disk resource	Name	md
	Details Tab: Data Partition Drive Letter	G:
	Details Tab: Cluster Partition Drive Letter	F:
Azure probe port resource	Name	azurepp1
	Probe port	26001 (Value specified for Port of Health probe)

Monitor resource name	Setting item	Setting value
Mirror disk monitor	-	-
resource		
Azure probe port monitor	Name	azureppw1
resource	Recovery Target	azurepp1
Azure load balance	Name	aurelbw1
monitor resource	Recovery Target	azurepp1
Custom monitor resource	Name	genw1
	Script created with this product	On
	Monitor Type	Synchronous
	Normal Return Value	0
	Recovery Action	Execute only the final action
	Recovery Target	LocalServer
IP monitor resource	Name	ipw1
	Server to monitor	node-1
	IP address	10.5.0.121
	Recovery Action	Execute only the final action
	Recovery Target	LocalServer
IP monitor resource	Name	ipw2
	Server to monitor	node-2
	IP address	10.5.0.120
	Recovery Action	Execute only the final action
	Recovery Target	LocalServer
Multi-target monitor	Name	mtw1
resource	Monitor resource list	genw1
		ipw1
		ipw2
	Recovery Action	Execute only the final action
	Recovery Target	LocalServer
	Execute Script before Final	On
	Action	
	Timeout	30

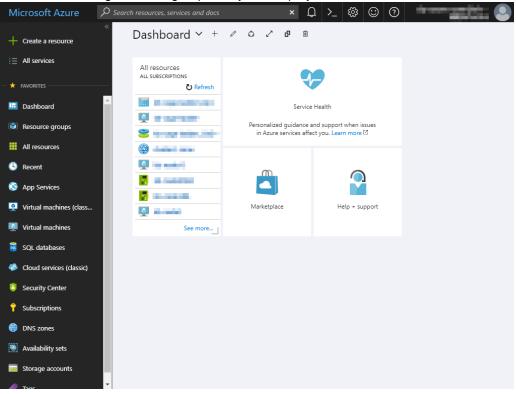
• EXPRESSCLUSTER settings (monitor resource)

4.2 Configuring Microsoft Azure

1) Creating a resource group

Log in to the Microsoft Azure portal (https://portal.azure.com/) and create a resource group following the steps below.

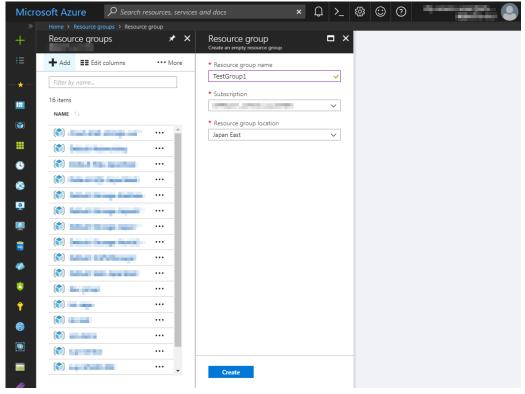
1. Select **Resource groups** or the resource group icon in the menu on the left side of the window. If there are existing resource groups, they are displayed in a list.



2. Select +Add at the upper left of the window.

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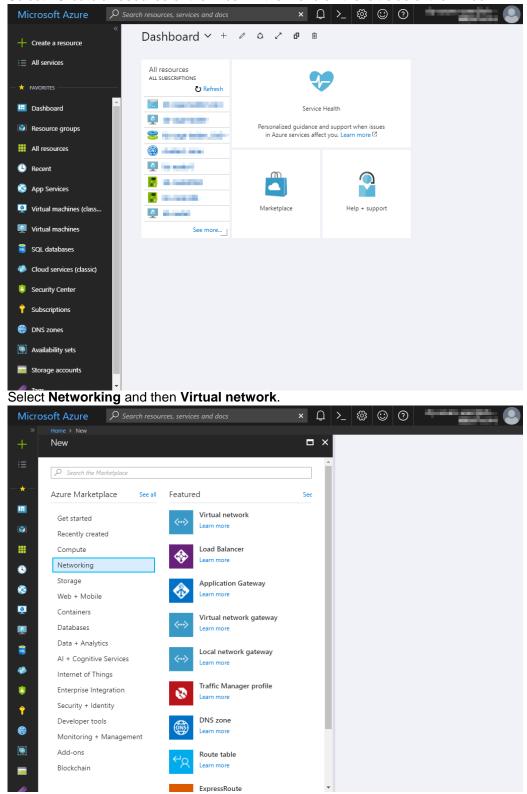
3. Specify Resource group name, Subscription, and Resource group location, and click Create.



2) Creating a virtual network

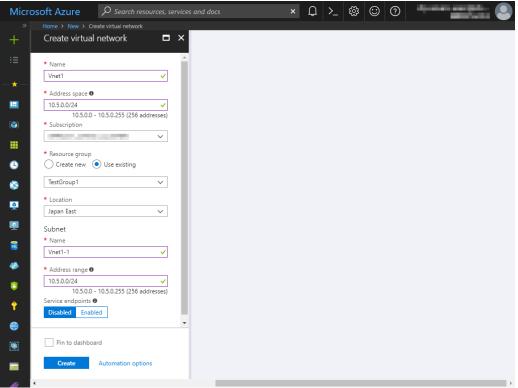
Log in to the Microsoft Azure portal (https://portal.azure.com/) and create a virtual network following the steps below.

1. Select +Create a resource or the + icon in the menu on the left side of the window.



2.

3. Specify Name, Address space, Subscription, Resource group name, Location, Name of Subnet, and Address range, and click Create.

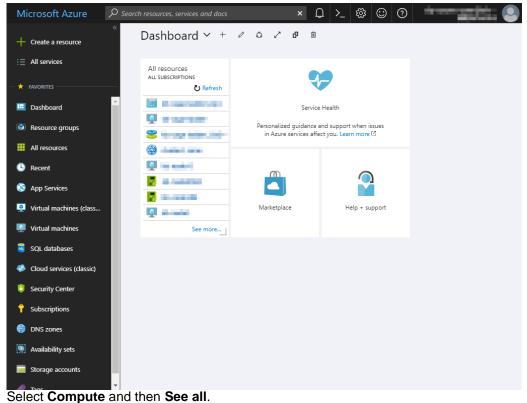


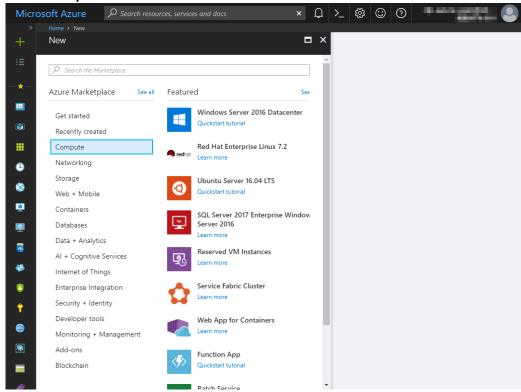
3) Creating a virtual machine

Log in to the Microsoft Azure portal (https://portal.azure.com/) and create virtual machines and disks following the steps below.

Create as many virtual machines as required to create a cluster. Create node-1 and then node-2.

1. Select +Create a resource or the + icon in the menu on the left side of the window.





2.

- 3. Select Windows Server 2016 Datacenter.
- 4. The Basics blade is displayed. Specify Name, VM disk type, User name, Password, Confirm password, Subscription, Resource group name, and Location, and click OK. For Name, specify node-1 for node-1 and node-2 for node-2.

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5. The **Choose a size** blade is displayed. Select the size appropriate for the usage purpose of the virtual machines from the list and click **Select**. In this guide, **A1 Standard** is selected.

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- 6. The Settings blade is displayed. Specify Availability set, Storage account, Public IP address, Network security group, and Diagnostics storage account.
- 7. Select No for Use managed disks.

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8. Return to the Settings blade and select Availability set. For node-1, the Change availability set blade is displayed. Select Create new. Specify Name, Fault domains, and Update domains, and click OK. For node-2, the Change availability set blade is displayed. Select AvailabilitySet-1 created for node-1

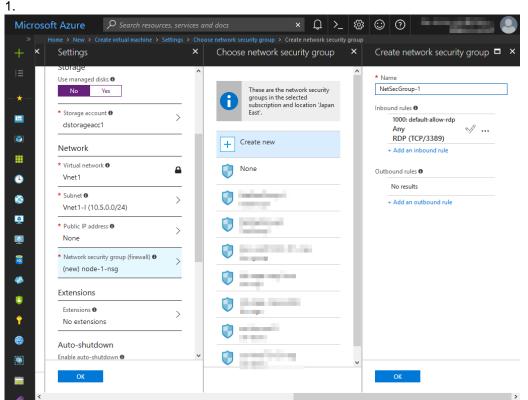
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9. Select Storage account. For node-1, the Create storage account blade is displayed. Specify Name, Performance, and Replication, and click OK. For node-2, the Choose storage account blade is displayed. Select clstorageacc1 created for node-1.

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- 10. Return to the Settings blade and select Public IP address.
- 11. The Choose public IP address blade is displayed. Select None. Ignore the Create public IP address blade.

12. Return to the Settings blade and select Network security group. For node-1, the Create network security group blade is displayed. Specify Name and click OK. For node-2, the Choose network security group blade is displayed. Select NetSecGroup-1 created for node-



 Select Storage account. For node-1, the Create storage account blade is displayed. Specify Name, Performance, and Replication, and click OK. For node-2, the Choose storage account blade is displayed. Select clstorageaccdiag1 created for node-1.

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- 14. Return to the Settings blade and click OK.

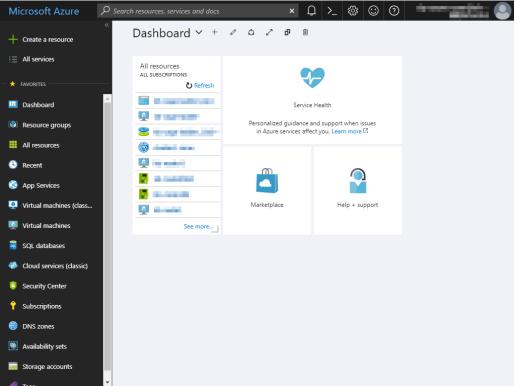
15. The **Create** blade is displayed. Check the contents displayed on the **Create** blade and click **Create** if the contents are correct.

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4) Setting a private IP address

Log in to the Microsoft Azure portal (https://portal.azure.com/) and change the private IP address setting following the steps below. Since an IP address is initially set to be assigned dynamically, change the setting so that an IP address is assigned statically. Change the settings of node-1 and then node-2.

1. Select **Resource groups** or the resource group icon in the menu on the left side of the window.



2. Select TestGroup1 from the resource group list.

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3. The summary of TestGroup1 is displayed. Select virtual machine node-1 or node-2 from the item list.

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5. Select a network interface displayed in the list. The network interface name is generated automatically.

6. Select IP configurations.

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- 7. Only ipconfig1 is displayed in the list. Select it.
- 8. Select **Static** for **Assignment** under **Private IP address settings**. Enter the IP address to be assigned statically in the **IP address** text box and click **Save** at the top of the window. The IP address of node-1 is 10.5.0.120. The IP address of node-2 is 10.5.0.121.

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9. The virtual machines restart automatically so that new private IP addresses can be used.

2.

5) Adding Blob storage Log in to the Microsoft Azure portal (https://portal.azure.com/) and add Blob storage to be used for a mirror disk (cluster partition or data partition). Change the settings of node-1 and then node-2.

Select **Resource groups** or the resource group icon in the menu on the left side of the window. 1.

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3. The summary of TestGroup1 is displayed. Select virtual machine node-1 or node-2 to which to add Blob storage from the item list and select **Disk**.

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5. The Attach unmanaged disk blade is displayed. Click Browse right to the Storage container text box. For Name and Storage blob name, the automatically generated default values are entered.

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7. Select vhds from the container list and click Select.

8. The Attach unmanaged disk blade is displayed again. Specify Name, Source type, Account type, Size, and Storage blob name, and click OK. For Name, specify Node-1Blob1 for node-1 and Node-2Blob1 for node-2. For Storage blob name, specify Node-1Blob1.vhd for node-1 and Node-2Blob1.vhd for node-2.

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9. Click Save.

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6) Configuring virtual machines

Log in to the created node-1 and node-2 and specify the settings following the procedure below. Set a partition for the mirror disk resource. Create a file system in the added Blob storage. For details about a partition for the mirror disk resource, see "Partition settings for mirror disk resource (when using Replicator)" in "Settings after configuring hardware" in Chapter 1, "Determining a system configuration" in the *Installation and Configuration Guide*.

1. Open the **Disk Management** window. The **Initialize Disk** dialog box is displayed.

Initialize Disk	:
You must initialize a disk before Logical Disk Manager can access it. Select disks:	
V Disk 2	
Use the following partition style for the selected disks:	
MBR (Master Boot Record) GPT (GUID Partition Table)	
Note: The GPT partition style is not recognized by all previous versions of Windows.	
OK Cancel	

2. Confirm that the added disk is displayed as "Disk 2" in unassigned state under the existing C drive and D drive.

📅 Disk Managem	ient						-		×
<u>File Action V</u> i	ew <u>H</u> elp								
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Volume	Layout	Туре	File System	Status	Capacity	Free Spa	% Free		
🧰 (C:)	Simple	Basic	NTFS	Healthy (S	127.00 GB	113.12 GB	89 %		
🖛 Temporary Stora	ag Simple	Basic	NTFS	Healthy (P	70.00 GB	68.77 GB	98 %		
Disk 0 Basic	(C)			7//////////////////////////////////////		///////////////////////////////////////	7/7/7/7/	7777	77777
127.00 GB	127.00 GB NTFS								
Online	Healthy (System,	Boot, Active,	Crash Dump, P	rimary Partition	5//////////////////////////////////////				
Tisk 1									
Basic	Temporary Stora	ge (D:)							-
70.00 GB Online	70.00 GB NTFS	-							
Unline	Healthy (Page File	, Primary Pa	rtition)						
	1								
- Disk 2									
Basic									
20.00 GB Online	20.00 GB Unallocated								
onnie	Unanocated								
	1								
Unallocated	Primary partition								

Create a cluster partition. Right-click "Disk 2" and select New Simple Volume.
 The Welcome to the New Simple Volume Wizard is displayed. Click Next.

New Simple Volume Wizard		×
	Welcome to the New Simple Volume Wizard	
	This wizard helps you create a simple volume on a disk.	
	A simple volume can only be on a single disk.	
	To continue, click Next.	
	< <u>B</u> ack <u>N</u> ext > Cancel	

5. The **Specify Volume Size** window is displayed. Allocate 1024 MB (1,073,741,824 bytes) or more to a cluster partition. Click **Next**.

Specify Volume Size Choose a volume size that is betwee	en the maximum and minimum sizes.	
Maximum disk space in MB:	20477	
Minimum disk space in MB:	8	
Simple volume size in MB:	1024	
	< Back Next >	Cance

6. The Assign Drive Letter or Path window is displayed. Select the F drive for Assign the following drive letter:. Use the disk as a raw partition without formatting.

New Simple Volume Wizard			×
Assign Drive Letter or Path For easier access, you can assign a drive let	ter or drive path	to your partition.	
Assign the following drive letter: Mount in the following empty NTFS folder Do not assign a drive letter or drive path	Brows	۷ ۵	
	< <u>B</u> ack	<u>N</u> ext >	Cancel

- 7. Next, create a data partition. Right-click "Disk 2" and select New Simple Volume.
- 8. The Welcome to the New Simple Volume Wizard is displayed. Click Next.
- 9. The Specify Volume Size window is displayed. Click Next.

en the maximum and minimum sizes.	
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	19453 8 18558 :

10. The Assign Drive Letter or Path window is displayed. Select the G drive for Assign the following drive letter: and click Next.

New Simple Volume Wizard X	
Assign Drive Letter or Path For easier access, you can assign a drive letter or drive path to your partition.	
Assign the following drive letter: G Mount in the following empty NTFS folder: Browse Do not assign a drive letter or drive path	
Cancel Cancel The Format Partition window is displayed New Simple Volume Wizard X	I. Confirm that File system is NTFS .
Format Partition To store data on this partition, you must format it first.	
Choose whether you want to format this volume, and if so, what settings you want to use.	
◯ <u>D</u> o not format this volume	
Format this volume with the following settings:	
Ele system: VTFS V	
Allocation unit size: Default ~	
Volume label: New Volume	
✓ Perform a quick format	
Enable file and folder compression	
< <u>B</u> ack <u>N</u> ext > Cancel	

 Click Next.
 The Completing the New Simple Volume Wizard window s displayed. Check the displayed contents and click Finish.

New Simple Volume Wizard		Х
	Completing the New Simple Volume Wizard	
	You have successfully completed the New Simple Volume Wizard.	
	You selected the following settings: (Volume the: Single Yolume Dick selected: Dick 2 Volume size: 19453 MB Drive letter or path: G: File system: NTFS Allocation unit size: Default Volume labe! New Volume (2 aick format: Yea To close this wizard, click Finish.	
	< Back Finish Cancel	

14. Confirm that the added disks are assigned as the F drive and G drive.

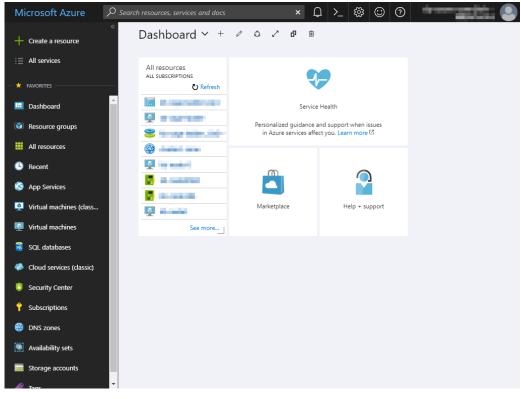
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/olume	Layout	Туре	File System	Status	Capacity	Free Spa	% Free	
🗰 (C:)	Simple	Basic	NTFS	Healthy (S	127.00 GB	111.94 GB	88 %	
- (F:)	Simple	Basic	RAW	Healthy (P	1.00 GB	1.00 GB	100 %	
New Volume	(G:) Simple	Basic	NTFS	Healthy (P	19.00 GB	18.94 GB	100 %	
Temporary St	torag Simple	Basic	NTFS	Healthy (P	70.00 GB	68.77 GB	98 %	
Disk 0 Basic 127.00 GB Online	(C:) 127.00 GB NTFS Healthy (Syster		ve, Crash Dump, I	Primary Partition)			
70.00 GB	Temporary Sto 70.00 GB NTFS Healthy (Page I	-	Partition)					
Disk 1 Basic 70.00 GB Online	70.00 GB NTFS	-	Partition)					
Basic 70.00 GB Online	70.00 GB NTFS	File, Primary I	Ne 19	ew Volume (G:) 1.00 GB NTFS ealthy (Primary P				
Basic 70.00 GB Online Disk 2 Basic 20.00 GB Online	70.00 GB NTFS Healthy (Page I (F:) 1.00 GB RAW	ry Partition)	Ne 19	.00 GB NTFS				

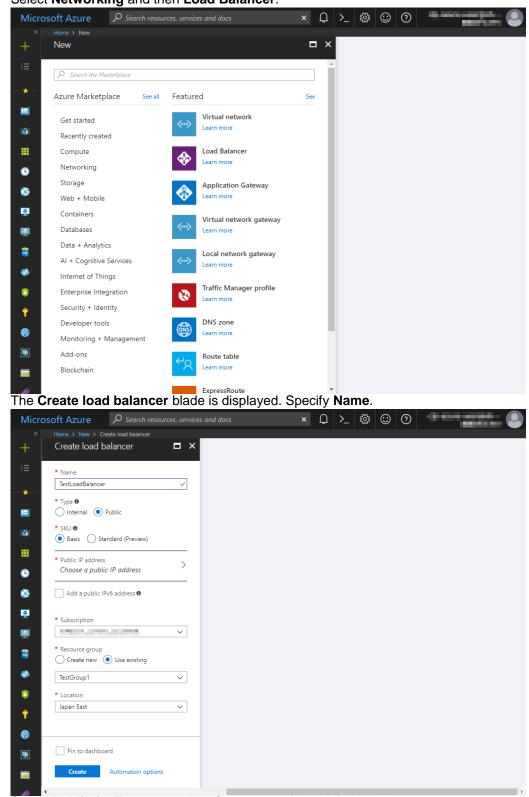
7) Configuring a load balancer

Log in to the Microsoft Azure portal (https://portal.azure.com/) and add a load balancer following the steps below.

For details, see the following websites:

- Azure Load Balancer overview: https://docs.microsoft.com/en-us/azure/load-balancer/load-balancer-overview
- Creating an Internet-facing load balancer using the Azure portal https://docs.microsoft.com/en-us/azure/load-balancer/load-balancer-get-started-internet-portal
- 1. Select +Create a resource or the + icon in the menu on the left side of the window.





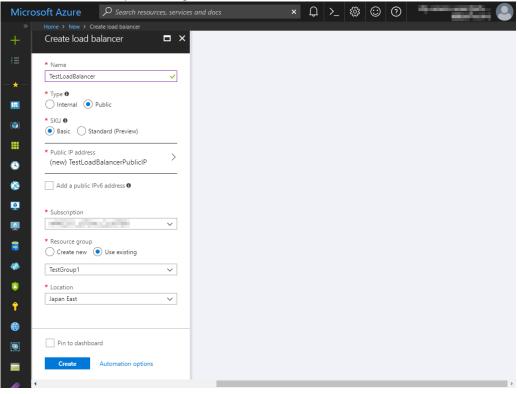
2. Select Networking and then Load Balancer.

3.

4. Select Public for Type and select Create new for Public IP address.

- ${\cal P}$ Search resources, services and docs × Choose public IP address Dynamic public IP addresses that are not in use won't have an IP address assigned to them Create public IP address □ × * Name These are the public IP addresses of SKU 'Basic' in the selected subscription and location 'Japan East'. TestLoadBalancerPublicIP 8 * SKU 🛛 Basic Standard (Preview) 122 + Create new Assignment O Dynamic 💽 Static Mercedik 2018 for the former of the former o 0 > • 0 ۲ 0 <u>@</u> \sim 0 8 0 **@** \sim 0 Ê \sim 0 Ŷ 6 0 ОК
- 5. Specify Name and Assignment, and click OK.

6. Specify **Subscription**, **Resource group**, and **Location**, and click **Create**. Deploying the load balancer starts. This processing takes several minutes.



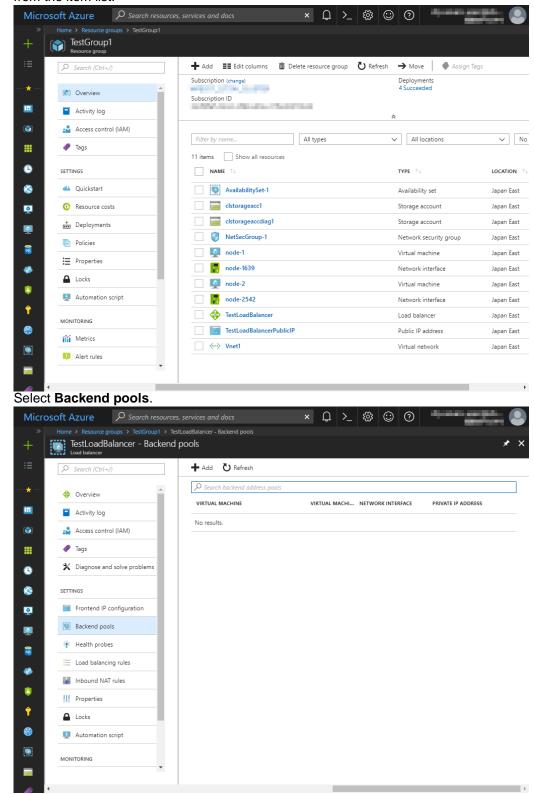
 8) Configuring a load balancer (configuring a backend pool)
 1. Associate a virtual machine registered to the availability set to the load balancer. After the load balancer has been deployed, select Resource groups or the resource group icon in the menu on the left side of the window.

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📦 Resource groups	S tray him.int		and support when issues ect you. Learn more 🛙	
All resources				
🕓 Recent				
App Services				
🙎 Virtual machines (class	Q erene	Marketplace	Help + support	
Virtual machines	See more			
SQL databases				
Cloud services (classic)				
Security Center				
Ŷ Subscriptions				
DNS zones				
Availability sets				
Storage accounts				
P Toos	•			

Select the resource group to which the created load balancer belongs from the resource group 2. list.

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Home > Resource groups						
+ Resource groups						* >
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3. The summary of the selected resource group is displayed. Select the created load balancer from the item list.



5. Click Add.

4.

- 6. The Add backend pool blade is displayed. Specify Name.
- 7. For Associated to, select Availability set.
- 8. Specify Availability set.
- 9. Click Add a target network IP configuration.
- 10. Specify the target virtual machine for Target virtual machine and Network IP configuration.

- Repeat steps 9 and 10 as many times as the number of target virtual machines.
 Click **OK**.

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+ :	Add backend pool TestLoadBalancer		×							
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-*-	lestBackendPool									
	IPv4 IPv6									
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	Availability set	~								
	Availability set		_							
•	AvailabilitySet-1 number of virtual machines: 2	~	,							
Q Q	Only VMs within the current availability set can be chosen. Once a VM is chosen, you can s network IP configuration related to it. 	Ō	_							
	* Target virtual machine ❶	Ō	-							
6 2	node-2 size: Standard_A1, network interfaces: 1	~								
<u> </u>	* Network IP configuration 0									
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9) Configuring a load balancer (configuring a health probe) 1. Select Health probes.

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+	TestLoadBalancer - Health p	robes 🖈 🗙
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	Access control (IAM)	No results.
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<u>@</u>	Frontend IP configuration	
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65	🧮 Load balancing rules	
	lnbound NAT rules	
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	 Diagnostics logs 	

- 2. Click Add.
- The Add health probe blade is displayed. Specify Name.
 Specify Protocol and Port, and click OK.

Micros	oft Azure	${\cal P}$ Search resources, services and docs	×	Q	>_	ŝ	\odot	?	-0-00	-	
+	Add health pro TestLoadBalancer	obe		□ ×							
÷≡	* Name										
 *	TestHealthProbe			~							
	IP version IPv4										
	Protocol HTTP TCP										
	* Port										
•	26001			~							
~	* Interval										
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Q	* Unhealthy thresho	old 🛛	SE	conds							
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<u></u> 4											Þ

10) Configuring a load balancer (setting the load balancing rules)
1. Select Load balancing rules.

	osoft Azure P Search resources,		
+	Home > TestLoadBalancer - Load balancing rule		×
∷≡	Search (Ctrl+/)	+ Add	
- * -	💠 Overview 🔦		
	Activity log	NAME 14 LOAD BALANCING RULE 14 BACKEND POOL 14 HEALTH PROBE 14	
	Access control (IAM)	No results.	
	Tags		
<u>(</u>)	X Diagnose and solve problems		
©	SETTINGS		
<u>9</u>	Frontend IP configuration Backend pools		
1	P Health probes		
@	E Load balancing rules		
۲	Inbound NAT rules		
Ŷ	Properties		
6	Automation script		
	MONITORING		
	v		

- 2. Click Add.
- The Add load balancing rule blade is displayed. Specify Name. Specify Port and Backend port, and click OK. 3.
- 4.

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>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>			_		
+ : Add load ba TestLoadBalancer	lancing rule	□ ×			
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Protocol					
	0P				
* Port 80					
Backend port 8080					
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	ol (2 virtual machines)	~			
Health probe 0					
TestHealthProbe		~			
Session persistence	ce 0				
None		~			
ldle timeout (min	utes) 0	4			
Floating IP (direct	server return) 0				
Disabled Ena	bled				
			·		
ок					
<u> </u>					>

11) Setting the inbound security rules

Log in to the Microsoft Azure portal (https://portal.azure.com/) and set the inbound security rules following the steps below.

1. Select **Network security groups** or the network security group icon in the menu on the left side of the window.

Mi	crosoft Azure	${\cal P}$ Search resources, services and docs	×	ਹੇ ≻_ 🕸 😳 ઉ	
+	Create a resource	≪ Dashboard ∽ +	/ △ ∠ ∂ ∅		
:=	All services				
_ +	FAVORITES	All resources ALL SUBSCRIPTIONS	9	2	
	Dashboard	€ Refresh	Carrier	: Health	
	Resource groups	👰 e narmer		and support when issues	
	All resources			ect you. Learn more 🖄	
_	Recent				
	App Services	a same			
	Virtual machines (class		Marketplace	Help + support	
	Virtual machines	See more			
	SQL databases				
<i>.</i>	Cloud services (classic)				
©	Security Center				
Ŷ	Subscriptions				
	DNS zones				
	Availability sets				
	Storage accounts				
Sel	ect NetSecG	roup-1 from the networ	rk security arou	ın list	
	crosoft Azure	\mathcal{P} Search resources, services and docs	× 1	ביים אביים ביים ביים ביים ביים ביים ביים ביים	
		ecurity groups			
+	Network secu	rity groups			* ×
:=	-	t columns 🕐 Refresh 🛛 🔷 Assign Tags			
-*	Subscriptions: WPE	EC07_1ITSW_CLUSTER -	V All loca	tions	✓ No grouping ✓
	7 items				
(*)			RESOURCE GROUP $\uparrow \downarrow$	LOCATION	SUBSCRIPTION 1
	_	and the second se	ing and	Sec. 1	
•				Sector Contraction	
۵		n ayan in an		Territoria di Constanti di Consta	
<u>9</u>		cGroup-1	TestGroup1	Japan East	
N					

•••

and the second

3. The summary of NetSecGroup-1 is displayed.

2.

4. Select Inbound security rules.

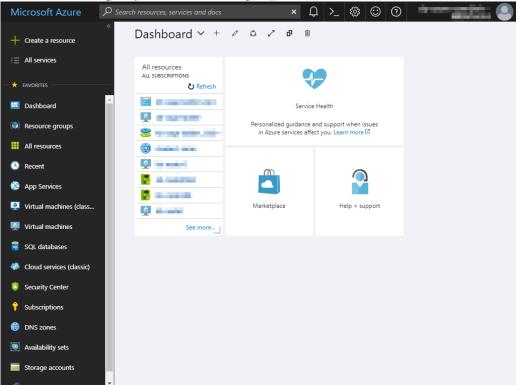
5.

6. 7.

× ♫ ≻_ ♡ ⑦ NetSecGroup-1 - Inbound security rules + Add 🔊 Default rules * PRIORITY NAME PORT PROTOCOL SOURCE DESTINATION Overview l. 1000 ▲ default-allow-rdp 3389 тср Any Activity log Any 65000 AllowVnetInBound VirtualNetwork VirtualNetwork Any Any Access control (IAM) AllowAzureLoadBalancerInBo... Any 65001 Any AzureLoadBala... Any 🥒 Tags 65500 DenyAllInBound Any Any Any Any X Diagnose and solve problems SETTINGS <u>0</u> 📩 Inbound security rules 🚣 Outbound security rules Retwork interfaces squ <-> Subnets Properties Ē. A Locks Automation script 6 MONITORING Diagnostics logs Click Add. The Add inbound security rule blade is displayed. Specify Name. Specify Destination port range and Protocol, and click OK. × 🗘 >_ 🎲 😳 🕐 Add inbound security rule ∎ × 🖌 Basic * Source 0 * Any \sim 1... * Source port ranges 0 ٢ * Destination 0 Any \sim * Destination port ranges 0 8080 8 * Protocol . TCP UDP Any Action All Deny 244 * Priority 🛛 -100 * Name e TestHTTP Ŷ Description 1

Then, check <*Load_balancer_frontend_IP(public_IP_address)*> specified in the script before recovery action of the multi-target monitor resource that is set in "3)**Adding a monitor resource**." Write down the confirmatory result.

1. Select **Resource groups** or the resource group icon in the menu on the left side of the window.



2. Select the resource group to which the created load balancer belongs from the resource group list.

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+ Reso	ource grou	ıps								* :
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Subscr	riptions:		_							
Filter	by name		All locations					\sim	No grouping	\sim
17 iten	ns									
	NAME 🛝			SUBSCRIPTIO	DN 🛝			LOCATION	†↓	
		table and the		-				South Cent	ral US	••••
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(Charles Andrea						East Asia		
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	(*)	100 M		(1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,	1996), A			Japan East		
	TestGr	oup1		(1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,	1996), A			Japan East		••• •

3. The summary of the selected resource group is displayed. Select the created load balancer from the item list.

Resource group	➡ Add 📑 Edit columns 💼 Delete resource grou	p 🖏 Refresh → Move 🛛 🌒 Assign Ta	
	Add Edit columns Delete resource grou Subscription (change)	p ♥ Refresh → Move ♥ Assign Ta Deployments	ags
(🕥 Overview	Subscription ID	4 Succeeded	
Activity log		*	
Access control (IAM)			
🖉 Tags	Filter by name All types	✓ All locations	\checkmark
ETTINGS	11 items Show all resources	TYPE ↑↓	LOCATION
🕰 Quickstart	AvailabilitySet-1	Availability set	Japan Eas
Resource costs	clstorageacc1	Storage account	Japan Eas
Deployments	clstorageaccdiag1	Storage account	Japan Eas
Policies	NetSecGroup-1	Network security group	Japan Ea
Properties	node-1	Virtual machine	Japan Ea
Locks	node-1639	Network interface	Japan Ea
Automation script	node-2542	Virtual machine Network interface	Japan Ea Japan Ea
	TestLoadBalancer	Load balancer	Japan Ea
NITORING	TestLoadBalancerPublicIP	Public IP address	Japan Ea
Metrics		Virtual network	Japan Ea
t Azure P Search resou		Public IP address from >_	
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	rcces, services and docs × r r r r r r r r r r r r m services and docs × Testors r r r r r r r r r r r r r	Backend pool TestBackendPool (2 virtual machines) Health probe TestHealthProbe (TCP:26001) Load balancing rule TestLoadBalancingRule (TCP/80 to TCP/8) NAT rules - Public IP address	n the ite

4.

12) Adjusting the OS startup time, checking the network setting, checking the firewall setting, synchronizing the server time, and disabling the power saving function. For each procedure, see "Settings after configuring hardware" in Chapter 1, "Determining a system configuration" in the *Installation and Configuration Guide*.

13) Installing EXPRESSCLUSTER

For the installation procedure, see the *Installation and Configuration Guide*. After installation is complete, restart the OS.

14) Registering the EXPRESSCLUSER license

For the license registration procedure, see the Installation and Configuration Guide.

4.3 Configuring the EXPRESSCLUSTER settings

Configure the following on the WebManager cluster generation wizard. For the WebManager setup and connection procedures, see Chapter 5, "Creating the cluster configuration data" in the the *Installation and Configuration Guide*.

This section describes the procedure to add the following resources and monitor resources:

- Mirror disk resource
- Azure probe port resource
- Azure probe port monitor resource
- Azure load balance monitor resource
- Custom monitor resource (for NP resolution)
- IP monitor resource (for NP resolution)
- Multi-target monitor resource (for NP resolution)

For the settings of other resources and monitor resources, see the *Installation and Configuration Guide* and the *Reference Guide*.

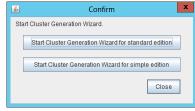
1) Creating a cluster

Start the cluster generation wizard to create a cluster.

- Creating a cluster
 - 1. Access WebManager. Then, the following dialog box is displayed. Click **Start cluster generation wizard**.

<u>\$</u>	Confirm
The clus	ster is not constructed.
	Start cluster generation wizard.
	Import cluster configration file.
	Close

- 2. The following dialog box is displayed.
 - Click Start Cluster Generation Wizard for standard edition.



3. The **Cluster Definition** page is displayed. Enter a desired name in **Cluster Name**.

Select an appropriate language in **Language**. After the setting is applied, the display language of WebManager is changed to the selected language.

<u></u>	Cluste	er Generation Wizard			x
Steps	Cluster Definition				
	Cluster Na <u>m</u> e Clu	uster1			
Server	<u>C</u> omment				
Basic Settings	Language En	glish			-
Interconnect	Management IP Address	-			
NP Resolution	management in Address				
Group Monitor					
wontor					
	Description				
	Start generating the cluster.				
	Enter the cluster name, and then	select the language (locale) of the environment that ru er to manage multiple clusters, specify a unique clust			ter
	The management IP address is a	floating IP address used for a WebManager connections, the management IP address can be omitted.			
	To continue, click [Next].	, de management r address can be omitted.			
			< <u>B</u> ack	<u>N</u> ext >	Cancel

4. The Server Definition page is displayed.

The instance connected to WebManager is displayed as a registered master server. Click **Add** to add the remaining instances (by specifying the private IP address of each instance).

Add Server X
Server Name or IP Address:
10.5.0.121
Description Enter an IP address or a server name. When entering a server name, name resolution is necessary. Both IPv4 and IPv6 for IP address can be used. When entering an IP address, the server name is automatically acquired.
OK Cancel

5. Click Next.

Steps Server Definition List Server Server Server Basic Settings Interconnect Interconnect NP Resolution Group Monitor Monitor Up Server Group Server Group Server Group Server Group Server Group Server Group Server Group Definition Settings Description Settings Click "Add" to add servers constructing the cluster. Click "Settings" to configure the server group when using the server group.	<u>\$</u>	Cluster Generation Wizard
✓ Cluster Order Name Agd Server Master Server node-1 Remove Interconnect node-2 Remove Monitor Up Down Server Group Server Group Server Group Server Group Server Group Settings Description Settings Click "Add" to add servers constructing the cluster. Click "Add" to add server priority.	Steps	
Basic Settings Interconnect NP Resolution Group Monitor Up Server Group Server Group Server Group Server Group Definition Description Click "Add" to add servers constructing the cluster. Click "Up" or "Down" to change the server priority.		Order Name Add Master Server node-1
Interconnect NP Resolution Group Monitor Up Dgwn Server Group Server Group Server Group Server Group Definition Description Click "Add" to add servers constructing the cluster. Click "Vp" or "Down" to change the server priority.		1 node-2 Remove
NP Resolution Group Monitor Up Down Server Group Server Group Server Group Definition Description Click "Add" to add servers constructing the cluster. Click "Vp" or "Down" to change the server priority.		
Group Monitor		
Monitor Monitor Server Group Server Group Server Group Definition Description Click "Add" to add servers constructing the cluster. Click "Up" or "Down" to change the server priority.		
Server Group Server Group Definition Description Click "Add" to add servers constructing the cluster. Click "Description	Group	
	Monitor	Dgwn Server Group Definition Description Click "Add" to add servers constructing the cluster. Click "Up" or "Down" to change the server priority.

6. The **Interconnect** page is displayed.

Specify the IP addresses (IP address of each instance) to be used for interconnect. In addition, select mdc1 for **MDC** as a communication path of a mirror disk resource to be created later.

<u></u>			Clus	ster Generatio	on ۱	Vizard				x
Steps	Ē	Interconnect								
✓ Cluster		Interconnect List Priority Type MDC node-1 node-2 Add						Add		
					-		-	10.5.0.121	-	
🕂 Server										<u>R</u> emove
🤟 Basic Settings										
字 Interconnect										
NP Resolution										
Group										
Monitor										
										Up
										Down
	- [escriptio	2							Down
						touching the studen Oligin				
		For "Kerne	I mode" setting, confi	gure the route w	/hic	tructing the cluster.Click ". h is used for heartbeat. Fo				
			which is used only for I mode" setting, more			munication. re necessary to be configu	ıred	Configuring more the	an one	routes is
		recommei	nded.							
						sses for each communica erentially use the LAN only			mong th	ne cluster
			or the communication ad to the communicat			d for data mirroring comm lumn	iunio	cation, select the mirro	or disk o	connect name to
								Rack	Novt	Cancel
								< <u>B</u> ack	<u>N</u> ext :	> Cancel

7. Click Next.

8. The **NP Resolution** page is displayed.

Note that NP resolution is not configured on this page. The equivalent feature is achieved by adding the IP monitor resource, custom monitor resource, and multi-target monitor resource. Configure NP resolution in "3)Adding a monitor resource." Click Next.

\$	Cluster Generation Wizard
Steps	NP Resolution
 ✓ Cluster ⇒ Server ✓ Basic Settings ✓ Interconnect ⊴ NP Resolution Group Monitor 	NP Resolution List Type Ping Target node-1 node-2 Add Remove Properties Properties Properties
	Image:
	< <u>B</u> ack <u>N</u> ext> Cancel

2) Adding a group resource

• Defining a group

Create a failover group.

1. The **Group List** window s displayed. Click **Add**.

<u>\$</u>	Cluster Generation Wizard
Steps	Group
🛩 Cluster	Group List Name Type Add
♥ Server	Remove
Basic Settings	Properties
✓ Interconnect	
✓ NP Resolution Group	<u>Group Resource</u>
Monitor	
	Description
	Configure failover group to be a unit of fail over. Click "Add" to add a group.
	Click "Properties" to configure the properties of the selected group. Click "Group Resource" to add resource to the selected group.
	< <u>B</u> ack <u>N</u> ext> Cancel

2. The **Group Definition** window is displayed. Specify a failover group name (failover1) for **Name**.

<u></u>		Group Definition X
Steps	Group Definition	
✓ Cluster	<u>T</u> ype	failover
✓ Server		Use Server <u>G</u> roup Settings
	Na <u>m</u> e	failover1
⇒ Basic Settings	Comment	
Startup Servers		
Group Attributes		
Group Resources		
Monitor		
	Description	
	Select group type.	
	If using virtual machin "Failover".	e resources to cluster virtual machines, select "Virtual machine" as the type. In other cases, select
	If using server group,	check the "Use Server Group".
		<back next=""> Cancel</back>
Click Next		

3. Click Next.

4. The **Servers that can run the Group** page is displayed.

<u></u>	Group Definition(failover1)
Steps	Servers that can run the Group
🛩 Cluster	Failover is possible on all servers Servers that can run the Group Ayailable Servers
💙 Server	Servers Servers
눡 Group	node-2
✓ Basic Settings	< A <u>d</u> d
🕏 Startup Servers	<u>R</u> emove >
Group Attributes	
Group Resources	
Monitor	Down
	Select the server which can run the group and configure the priority of the servers. In case that all the servers which are registered to the cluster can start the group, check "Failover is possible at all servers" on. The priority order is the order which was set when the server was registered to the cluster. In case setting individually the server which can start the group, check "Failover is possible at all servers" off. Select the server which can start the group from the "Available Servers" list on the right side, and click "Add" to add the server to "Servers that can run the Group" list. Click "Up" or "Down" to change the priority order.
	<back next=""> Cancel</back>

5. The **Group Attribute Settings** page is displayed. Click **Next** without specifying anything.

<u></u>	Group Definition(failover1)	x
Steps	Group Attribute Settings	
•	Startup Attribute	
🛩 Cluster	Auto Startup O Manual Startup	
🛩 Server	Failover Attribute	
📮 Group	Auto Eailover	
	Use the startup server settings Failover dynamically Edit exclusion monitor	
✓ Basic Settings	Perform a Forced Failover	
✓ Startup Servers	Prioritize failover policy in the server group	
🚽 Group Attributes	Perform a Smart Failover	
Group Attributes	O Prioritize failover policy in the server group	
Group Resources	Enable only manual failover among the server groups	
Monitor	O Manual Failover	
	Failback Attribute O Auto Failback Manual Failback	
	Description	
	Configure starting failover group or actions of fail over. In case not automatically starting the group at cluster startup, set "Startup Attribute" to "Manual Startup". In case selecting the fail over destination considering the status of the monitor resource of each server at failure occurrence select "Failover dynamically" in "Auto failover". In case failower using the server group settings and prioritizing the server ins the same server group, select "Prioritize the failover policy inside the server group".	
	<u>≺Back</u> <u>N</u> ext> Can	cel

On this page, add a group resource following the procedure below.							
<u>*</u>	Group Definition(failo	over1)	x				
Steps	Group Resource Group Resource List						
🛩 Cluster	Name	Туре	Add				
✓ Server			Remove				
🖙 Group			<u>I</u> dinote				
✓ Basic Settings			Properties				
✓ Startup Servers							
🛩 Group Attributes							
🚽 Group Resources							
Monitor							
	Description						
	Click "Add" to add resources. Click "Properties" to configure the properties of the s	elected resource.					
		< <u>B</u> ack	Finish Cancel				

6. The **Group Resource** page is displayed.

Mirror disk resource

Create a mirror disk resource.

For details, see "Understanding mirror disk resources" in Chapter 5, "Group resource details" in the *Reference Guide*.

- 1. Click Add on the Group Resource List page.
- The Resource Definition of Group window is displayed. Select the group resource type (mirror disk resource) from the Type box and enter the group name (md) in the Name box.

<u></u>	Re	source Definition of Group(failover1)	
Steps	Group Resource Defin	itions	
🛩 Cluster			
🗸 Server	<u>T</u> ype	mirror disk resource	
눡 Group	Na <u>m</u> e	md	
✓ Basic Settings	<u>C</u> omment		
✓ Startup Servers			Get Licence Info
💙 Group Attributes			
👇 Group Resources			
😒 Info			
Dependency			
Recovery Operation			
Details	Description		
Monitor		presource and enter its name.	
			< Back Next > Can

127

4. The **Dependent Resources** page is displayed. Click **Next** without specifying anything.

Click Next without :	specifying anything.			
<u>\$</u>	Resource Definition of Group(failover1)			×
Steps	Eollow the default dependency			
✓ Cluster	Dependent Resources			Available Resources
✓ Server	Name Resource type	< A <u>d</u> d	Name	
🖵 Group		<u>R</u> emove >		
✓ Basic Settings				
✓ Startup Servers				
💙 Group Attributes				
👇 Group Resources				
💙 Info				
😒 Dependency				
Recovery Operation				
Details				
Monitor				
			< Back	Next > Cancel

 The Recovery Operation at Activity Failure Detection and Recovery Operation at Deactivity Failure Detection page is displayed. Click Next.

CIER NEAL.				
<u>\$</u>		Resource Definition of Group(failover1)		×
Steps	Execute Script be	fore or after Activation or Deactivation		Settings
🛩 Cluster	Recovery Operation	on at Activity Failure Detection		
🛩 Server	Retry Count			3 time
👇 Group	Failover Target S	erver		
🤎 Basic Settings	Stable	Server 🔾 Maximum	Priority Server	
💙 Startup Servers	Failover <u>T</u> hresho	d		1 time
🗸 Group Attributes	Einal Action	No operation (not activate next resource)		
🕒 Group Resources	Execute Scrip	t before Final Action		Settings
💙 Info	Recovery Operation	on at Deactivity Failure Detection		
Dependency	Retry Count at De	activation Failure		0 time
🔿 Recovery Operation	Final Acti <u>o</u> n	Stop the cluster service and shutdown OS		•
Details	Execute Scrip	t before Final Action		Settings
Monitor				
			< Back	Vext > Cancel

- 6. The **Details** page is displayed.
 - Select a server name in the **Name** column of **Servers that can run the group** and click **Add**.

<u>\$</u>	Resource Definition of Group(fail	over1)	x
Steps	Mirr <u>o</u> r Disk No.	1	-
🛩 Cluster	Data Partition Drive Letter		
💙 Server	Cluster Partition Drive Letter		
🕂 Group	Cluster Partition Offset Index	0	-
✓ Basic Settings	Mirror Disk Connect		Select
✓ Startup Servers			
✓ Group Attributes	Servers that can run the group Name Data Partition Cluster Partition	< Add Name	
Group Resources		node-1	
✓ Info		Remove > node-2	
Dependency			
Recovery Operation Details			
Monitor			
Monitor			
		Edit	
			Tuning
		< Back Finish	Cancel

7. The **Selection of partition** dialog box is displayed. Click **Connect**, select the data partition and cluster partition created in "6)**Configuring virtual machines**", and click **OK**.

Selection of partition X					
Partition					
Data Partitio	n			Obtain inform	
Volume	Disk No.	Partition No.	Size	GU Connect	
	0	1	500MB		
D:\	1	1	71677MB		
F:\	2	1	1024MB		
C:\	0	2	40458MB		
G:\	2	2	19453MB		
4					
GUID		-	-		
Cluster Parti	tion				
	1				
Volume	Disk No.	Partition No.	Size	GU	
	0	1	500MB		
D:\	1	1	71677MB	9	
F:\	2	1	1024MB		
C:\	0	2	40458MB		
G:\	2		19453MB		
•		III		•	
GUID	100 C				
-1.0					
OK Cancel					

8. Perform steps 6 and 7 for node-1 and then node-2 and click **Finish**.

<u>\$</u>	Resource Definition of Group(fa	illover1)
Steps	Mirr <u>o</u> r Disk No.	1
🛩 Cluster	Data Partition Drive Letter	G:
✓ Server	Cluster Partition Drive Letter	F:
눡 Group	Cluster Partition Offset Index	0
✓ Basic Settings	Mirror Disk Connect	Seject
✓ Startup Servers		COLOG
Group Attributes	Servers that can run the group	
👇 Group Resources	Name Data Partition Cluster Partition	< Add Name
✓ Info	node-2	<u>R</u> emove >
Dependency		
Recovery Operation		
🚽 Details		
Monitor		
		Edit
		Iuning
		< Back Finish Cancel

• Azure probe port resource

When EXPRESSCLUSTER is used on Microsoft Azure, EXPRESSCLUSTER provides a mechanism to wait for alive monitoring from a load balancer on a port specific to a node in which operations are running.

For details about the Azure probe port resources", see "Understanding Azure probe port resources" in Chapter 5, "Group resource details" in the *Reference Guide*.

1. Click Add on the Group Resource List page.

2. The **Resource Definition of Group** window is displayed. Select the group resource type (Azure probe port resource) from the **Type** box and enter the group name (azurepp1) in the **Name** box.

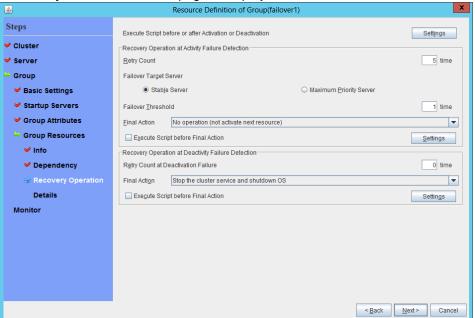
<u>\$</u>	Res	ource Definition of Group(failover1)		x
Steps	Group Resource Definiti	ions		
🛩 Cluster				
🛩 Server	<u>T</u> ype	Azure probe port resource		
🕂 Group	Na <u>m</u> e	azurepp1		
✓ Basic Settings	Comment			
🤟 Startup Servers				Get Licence Info
🤟 Group Attributes				
🖙 Group Resources				
😔 Info				
Dependency				
Recovery Operation				
Details	Deseriefer			
Monitor	Description			
	Select the type of group	resource and enter its name.		
			< Back	Vext > Cancel

3. Click Next.

4. The Dependent Resources page is displayed. Click Next without specifying anything.

<u></u>	Resource Definition of Group(failover1)
Steps	Eollow the default dependency
🛩 Cluster	Dependent Resources Available Resources
🛩 Server	Name Resource type
🖵 Group	Remove >
✓ Basic Settings	
💙 Startup Servers	
💙 Group Attributes	
👇 Group Resources	
💙 Info	
🔿 Dependency	
Recovery Operation	
Details	
Monitor	
	< <u>Back</u> <u>Next></u> Cancel

5. The Recovery Operation at Activity Failure Detection and Recovery Operation at Deactivity Failure Detection page is displayed. Click Next.



6. For **Probeport**, enter the value specified for **Port** when configuring a load balancer (configuring health probe).

A	Re	esource Definition of Group(failover1)		X
Steps				
🛩 Cluster	<u>P</u> robeport	26001		
🛩 Server				
🖙 Group				
✓ Basic Settings				
💙 Startup Servers				
🏼 Group Attributes				
👇 Group Resources				
✓ Info				
Dependency				
Recovery Operation				
😴 Details				
Monitor				
				<u>T</u> uning
			< Back Finish	Cancel

7. Click Finish.

3) Adding a monitor resource

Azure probe port monitor resource

The port monitoring mechanism for alive monitoring is provided for the node in which the Microsoft Azure probe port resource is running.

For details about the Azure probe port monitor resource, see "Understanding Azure probe port monitor resources" in Chapter 6, "Monitor resource details" in the *Reference Guide*.

Adding one Azure probe port monitor resource creates one Azure probe port monitor resource automatically.

Azure load balance monitor resource

The mechanism to monitor whether the port with the same port number as the probe port is open or not is provided for the node in which the Microsoft Azure probe port resource is not running.

For details about the Azure load balance monitor resource, see "Understanding Azure load balance monitor resources" in Chapter 6, "Monitor resource details" in the *Reference Guide*.

Adding one Azure probe port resource creates one Azure load balance monitor resource automatically.

• Custom monitor resource

Sets a script to monitor whether communication with Microsoft Azure Service Management API is possible, and also monitors health of communication with an external network.

For details about the custom monitor resource, see "Understanding custom monitor resources" in Chapter 6, "Monitor resource details" in the *Reference Guide*.

<u>&</u>	Cluster Generat	ion Wizard		×
Steps	Monitor Resource			
	Monitor Resource List			
💙 Cluster	Name	Туре		Add
✓ Server	azurelbw1	Azure load balance monitor		
 Server 	azureppw1 mdnw1	Azure probe port monitor mirror connect monitor		Remove
✓ Basic Settings	mdw1	mirror disk monitor		Properties
	userw	user mode monitor		Tuburu
Interconnect				
V NP Resolution				
🛩 Group				
🕏 Monitor				
	Description			
	Description			
	Click "Add" to add monitor resource.			
	Click "Property" to configure the properties of t	he selected monitor resource.		
	Click "Finish" to complete creating a cluster.			
			< Back	Finish Cancel

1. Click Add on the Monitor Resource List page.

2. Select the monitor resource type (custom monitor) from the **Type** box and enter the monitor resource name (genw1) in the **Name** box.

<u>\$</u>		Monitor Resource Definition	X
Steps	Monitor Resource Defini	tion	
 ✓ Cluster ✓ Server ✓ Group → Monitor ✓ Info Monitor(common) Monitor(special) Recovery Action 	<u>Г</u> уре Na <u>m</u> e <u>C</u> omment	custom monitor genw1	▼ GetLicence Info
	Description Select the type of monito	or resource and enter its name.	
			< <u>Back</u> <u>N</u> ext > Cancel

- 3. Click Next.
- 4. The **Monitor (common)** page is displayed. Confirm that **Monitor Timing** is **Always** and click **Next**.

<u>چ</u>	Monitor Resource Definition	x
Steps	Interval 60 sec	
✓ Cluster	Timeout 120 sec	
🛩 Server	Do Not Retry at Timeout Occurrence	
✓ Group	Do Not Execute Recovery Action at Timeout Occurrence	
P Monitor	Retry Count 1 time	
✓ Info	Wait Time to Start Monitoring 3 sec	
⇒ Monitor(common)		
Monitor(special)	Monitor Timing	
Recovery Action	O Agtive	
Recovery Action	Target Resource Browse	ר
		-
	Choose servers that execute monitoring Server	
	< Back Next > Cance	
	Calce Ideal	<u> </u>

5. The **Monitor (special)** page is displayed.

Select **Script created with this product**. The following shows the sample of a script to be created.

< *EXPRESSCLUSTER_installation_path*>\bin\clpazure_port_checker -h management.core.windows.net -p 443 EXIT %ERRORLEVEL%

Select Synchronous for Monitor Type.

<u>&</u>	1	Monitor Resource Definition	×
Steps	O User Application		
🛩 Cluster	Script created with this	product	
🛩 Server	<u>F</u> ile	genw.bat	
🛩 Group			<u>V</u> iew <u>E</u> dit Re <u>p</u> lace
🖙 Monitor	Monitor Type		
🛩 Info	Synchronous		○ As <u>v</u> nchronous
✓ Monitor(common)	Normal Return Value	0	
😪 Monitor(special)		1	
Recovery Action	Kill the application whe	en exit	
			Viewer/Editor tool can be changed Change
			< Back Next > Cancel

6. Click Next.

7. The **Recovery Action** page is displayed.

Select Execute only the final action for Recovery Action, LocalServer for Recovery Target, and No operation for Final action.

<u>چ</u>		Monitor Resource Definition	X
Steps	Recovery Action	Execute only the final action	▼
🛩 Cluster	Recovery Target	LocalServer	Browse
🛩 Server	Recovery Script Exe	cution Count	0 time
🛩 Group			
🛱 Monitor			
✓ Info	Execute Script be	fore Reactivation	
Monitor(common)	Maximum <u>R</u> eactivati	on Count	0 time
✓ Monitor(special)			
♀ Recovery Action	Execute Script be Execute migration Failover Target Serv Maximum Failover C Egecute Script be Einal Action	a before Failover er	Maximum Priority Server
			Script Settings

8. Click **Finish** to finish setting.

• IP monitor resource

Creates an IP monitor resource to monitor communication between clusters that are configured with virtual machines, and also to monitor whether communication with an internal network is health.

For details about the IP monitor resource, see "Understanding IP monitor resources" in Chapter 6, "Monitor resource details" in the *Reference Guide*.

- 1. Click Add on the Monitor Resource List page.
- 2. Select the monitor resource type (ip monitor) from the **Type** box and enter the monitor resource name (ipw1) in the **Name** box.

<u>چ</u>		Monitor Resource Definition		x
Steps	Monitor Resource Defin	ition		
✓ Cluster				
✓ Server	<u>T</u> ype	ip monitor		r
🛩 Group	Na <u>m</u> e	ipw1		
🕒 Monitor	Comment			
😒 Info			Get Licence Info	
Monitor(common)				
Monitor(special)				
Recovery Action				
	Description			
	Select the type of monit	or resource and enter its name.		
			< Back Next > Cance	el

3. Click Next.

4. The **Monitor (common)** page is displayed. Confirm that **Monitor Timing** is **Always**.

<u>s</u>	Monitor Resource Definition	X
Steps	Interval	60 sec
🛩 Cluster	Timeout	60 sec
✓ Server	Do Not Execute Recovery Action at Timeout Occurrence	
🛩 Group	Retry Count	1 time
👇 Monitor	Wait Time to Start Monitoring	0 sec
💙 Info		
🖙 Monitor(common)	Monitor Timing	
Monitor(special)	Always	
Recovery Action		
	Target Resource	Browse
	Choose servers that execute monitoring	Server
	< <u>B</u> ack <u>N</u> ex	t> Cancel

Select one available server for Choose servers that execute monitoring.

Failure De	etection Server		x
O All Servers			
● Sele <u>c</u> t			
Servers that can run the Group		Available Servers	
Name node-1	< A <u>d</u> d	Name node-2	
	<u>R</u> emove >	1000 2	-
I			
	OK	Cancel	pply

Click Next.

5. The Monitor (special) page is displayed.

<u>\$</u>	Monitor Resource Definition	×
Steps		
✓ Cluster	IP Addresses IP Address	Add
🛩 Server		Remove
🛩 Group		Edit
🖰 Monitor		Edit
✔ Info		
✓ Monitor(common)		
🖈 Monitor(special)		
Recovery Action		
	1	·
	ping Time <u>o</u> ut	5000 msec
	< <u>B</u> ack	Next > Cancel

On the **Common** tab, select **Add** of **IP Address** and set an IP address of a server other than the server selected in step 4.

	IP Address Settings	×
Interface		
IP Address	10.5.0.121	
	ОК	Cancel

6. Click Next.

<u></u>	Monitor Resource Definition	×
Steps		
✓ Cluster	IP Addresses	Add
✓ Server	10.5.0.121	Remove
✓ Group		
🖰 Monitor		Edit
🛩 Info		
✓ Monitor(common)		
🚽 Monitor(special)		
Recovery Action		
	ping Timeout	5000 msec
		·
		< Back Next > Cancel

- 7. The **Recovery Action** page is displayed.
 - Select Execute only the final action for Recovery Action, LocalServer for Recovery Target, and No operation for Final Action.

<u>*</u>		Monitor Resource Definition	X
Steps	Recovery Action	Execute only the final action	•
🛩 Cluster	Recovery Target	LocalServer	Browse
♥ Server	Recovery Script Exe	cution Count	0 time
🛩 Group			
눡 Monitor		×	
❤ Info	Execute Script b	efore Reactivation	
💙 Monitor(common)	Maximum <u>R</u> eactivat	ion Count	0 time
🏼 Monitor(special)	L		
Secovery Action	Execute Script b		
	Failover Target Sen	ver	O Maximum Priority Server
	Maximum Failover (Coun <u>t</u>	0 time
		\bigtriangledown	
	Execute Script b	efore Final Action	
	Einal Action	No operation	▼
			Script Settings
			< Back Finish Cancel

- 8. Click **Finish** to finish setting.
- 9. Then, create a monitor resource on the other server. Click Add on the Monitor Resource List page.

10.Select the monitor resource type (ip monitor) from the **Type** box and enter the monitor resource name (ipw2) in the **Name** box.

<u>چ</u>		Monitor Resource Definition		×
Steps	Monitor Resource Defin	ition		
🛩 Cluster				
✓ Server	<u>T</u> ype	ip monitor		-
🛩 Group	Na <u>m</u> e	ipw2		
🖙 Monitor	<u>C</u> omment			
😒 Info				Get Licence Info
Monitor(common)				
Monitor(special)				
Recovery Action				
	Description			
		or resource and enter its name.		
			< <u>B</u> ack	Next > Cancel

11. Click Next.

<u></u>	Monitor Resource Definition
 Steps Cluster Server Group Monitor ✓ Info ✓ Monitor(common) Monitor(special) Recovery Action 	Monitor Resource Definition Interval 60 sec Imeout 60 sec Do Not Retry at Timeout Occurrence 0 Not Execute Recovery Action at Timeout Occurrence Retry Count 1 time Wait Time to Start Monitoring 0 sec Monitor Timing 0 sec Agive Target Resource Target Resource Browse Choose servers that execute monitoring Server
	e server for Choose servers that execute monitoring. Detection Server Agailable Servers Agailable Servers KAdd Name Image: Name

OK Cancel Apply

Click Next.

12. The **Monitor (common)** page is displayed. Confirm that **Monitor Timing** is **Always**.

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13. The Monitor (special) page is displayed.

<u>\$</u>	Monitor Resource Definition
Steps	
✓ Cluster	IP Addresses Agd
✓ Server	Remove
🛩 Group	Edit
눡 Monitor	<u> </u>
✓ Info	
Monitor(common)	
🖙 Monitor(special)	
Recovery Action	
	ping Time <u>o</u> ut 5000 msec
	< Back Next > Cancel

On the **Common** tab, select **Add** of **IP Address** and set an IP address of a server other than the server selected in step 12.

	IP Address Settings	×
Interface		
IP Address	10.5.0.120	
	ок	Cancel

<u></u>		Monitor Resource Definit	ion		
Steps	IP Addresses				
🗸 Cluster	I Addresses	IP Address			A <u>d</u> d
🛩 Server	10.5.0.120				emove
🖊 Group					Edit
→ Monitor					
❤ Info					
Monitor(common)					
🚽 Monitor(special)					
Recovery Action					

- 15. The Recovery Action page is displayed. Select Execute only the final action for Recovery Action, LocalServer for Recovery Target, and No operation for Final action.

<u>\$</u>		Monitor Resource Definition	×
Steps	Recovery Action	Execute only the final action	▼
🛩 Cluster	Recovery Target	LocalServer	Browse
🛩 Server	Recovery Script Exe	ecution Count	0 time
🛩 Group			
🕂 Monitor			
💙 Info	Execute Script b	efore Reactivation	
Monitor(common)	Maximum <u>R</u> eactiva	tion Count	0 time
Monitor(special)			
♀ Recovery Action	Execute Script b	-	
	Failover Target Ser	ver	O Maximum Priority Server
	Maximum Failover	Coun <u>t</u>	0 time
		\bigtriangledown	
	Execute Script b	efore Final Action	
	Einal Action	No operation	▼
			Script Settings
			< Back Finish Cancel

16. Click Finish to finish setting.

Multi-target monitor resource

Creates a multi-target monitor resource to check the statuses of the custom monitor resource and IP monitor resource. The custom monitor resource monitors communication to Microsoft Azure Service Management API. The IP monitor resource monitors communication between clusters that are configured with virtual machines.

If their statuses are abnormal, execute the script in which the processing for NP resolution is described.

For details about the multi-target monitor resource, see "Understanding multi-target monitor resources" in Chapter 6, "Monitor resource details" in the *Reference Guide*.

- 1. Click Add on the Monitor Resource List page.
- 2. Select the monitor resource type (multi-target monitor) from the **Type** box and enter the monitor resource name (mtw1) in the **Name** box.

<u>\$</u>		Monitor Resource Definition		x
Steps	Monitor Resource Defini	tion		
🛩 Cluster				
🛩 Server	<u>T</u> ype	multi-target monitor		-
🛩 Group	Na <u>m</u> e	mtw1		
🍄 Monitor	<u>C</u> omment			
🕏 Info			Get Licen	ice Info
Monitor(common)				
Monitor(special)				
Recovery Action				
	Description			
	Select the type of monitor resource and enter its name.			
			< Back Next >	Cancel

- 3. Click Next.
- 4. The **Monitor (common)** page is displayed. Confirm that **Monitor Timing** is **Always** and click **Next**.

<u>*</u>	Monitor Resource Definition	x
Steps	Interval	60 sec
✓ Cluster	Timeout	60 sec
✓ Server	Do Not Retry at Timeout Occurrence	
✔ Group	Do Not Execute Recovery Action at Timeout Occurrence Retry Count	1 time
🖙 Monitor	Wait Time to Start Monitoring	0 sec
❤ Info		
🖙 Monitor(common)	Monitor Timing	
Monitor(special)	Always	
Recovery Action		
	Target Resource	Browse
	< <u>B</u> ack	t > Cancel

5. The Monitor (special) page is displayed.

From Available Monitor Resources, select the custom monitor resource (genw1) for checking communication with Service Management API and two IP monitor resources (ipw1 and ipw2) that are set to both servers. Then, click Add to add them to Monitor Resource List.

<u>چ</u>	Monitor Resource Definition		X
Steps	Monitor Resources		Available Monitor Resources
🛩 Cluster	Monitor Resource Type genw1 genw	< Add Mo	onitor Resource Type
♥ Server	ipw1 ipw ipw2 ipw	<u>R</u> emove >	
🗸 Group			
🌳 Monitor			
✓ Info			
Monitor(common)			
字 Monitor(special)			
Recovery Action			
			Tuning
		< <u>B</u> ack	<u>N</u> ext > Cancel

- 6. Click Next.
- 7. The Recovery Action page is displayed. Select Execute only the final action for Recovery action, LocalServer for Recovery Target, and No operation for Final action, and select the Execute Script before Final Action check box.

Click **Script Settings** and create a script to be executed when the multi-target monitor resource detects an error.

<u>\$</u>		Monitor Resource Definition	X
Steps	Recovery Action	Execute only the final action	•
🛩 Cluster	Recovery Target	LocalServer	Browse
♥ Server	Recovery Script Exect	ition Count	0 time
🛩 Group			
눡 Monitor			
✓ Info	Execute Script befo	ore Reactivation	
Monitor(common)	Maximum <u>R</u> eactivatio	n Count	0 time
🌱 Monitor(special)			
Recovery Action	Execute Script befg Execute Script befg Execute migration Failover Target Serve Maximum Failover Co Maximum Failover Co Execute Script befg Einal Action	before Failover	O Maximum Priority Server
			< <u>B</u> ack Finish Cancel

```
8. The script editing dialog box is displayed.
  Select Script created with this product and click Edit to edit the script. The following
  shows the sample of a script to be created.
  Specify the following by referring to "3.1 Creation example." The ports differ depending
  on operations.
  - Load balancing rule > Backend port of the load balancer
  - Load balancing rule > Port of the load balancer
  Set the public IP address that you wrote down in "11)Setting the inbound security
  rules" to the following:
  - Frontend IP (public IP address) of the load balancer
  -----
  rem Check Active Node
  <EXPRESSCLUSTER_installation_path>\bin\clpazure_port_checker -h 127.0.0.1 -p <
  Backend_port_of_the_load_balancer_of_Load_balancing_rule>
  IF NOT "%ERRORLEVEL%" == "0" (
     GOTO CLUSTER_SHUTDOWN
  )
  rem Check DNS
  <EXPRESSCLUSTER_installation_path>\bin\clpazure_port_checker
                                                                -h
                                                                       <
  Frontend_IP(public_IP_address)_of_the_load_balancer>
                                                           -p
                                                                       <
  Port_of_the_load_balancer_of_Load_balancing_rule>
  IF "%ERRORLEVEL%" == "0" (
     GOTO EXIT
  )
  rem Cluster Shutdown
  :CLUSTER_SHUTDOWN
  clpdown
  rem EXIT
  :EXIT
  EXIT 0
  -----
```

For **Timeout**, specify a value larger than the timeout value of clpazure_port_checker (fixed to five seconds). In the case of the above sample script, it is recommended to set a value larger than 10 seconds in order to execute clpazure_port_checker twice. Click **OK**.

	Edit Script	x
Script		
◯ <u>U</u> ser Ap	plication	
 Script cr 	eated with this product	
<u>F</u> ile	preaction.bat	
	View Edit Replace	
Time <u>o</u> ut	15 sec	
	Viewer/Editor tool can be changed Change	
	OK Cancel Apply	

9. Click **Finish** to finish setting.

4) Setting the cluster properties

For details about the cluster properties, see "Cluster properties" in Chapter 2, "Functions of the Builder" in the *Reference Guide*.

• Cluster properties

Configure the settings in **Cluster Properties** to link Microsoft Azure and EXPERSSCLUSTER.

1. Enter **Config Mode** from WebManager, right-click a cluster name, and select **Properties**.

\$	[Cluster1] Cluster Properties	x
Alert Log Delay Warning Info Interconnect NP	Disk Mirror Disk Account RIP(Legacy) Migration Extension Resolution Timeout Port No. Monitor Recovery Alert Service	WebManager
Cluster Na <u>m</u> e	Cluster1	
<u>C</u> omment		
<u>L</u> anguage	English	-
	OK Can	el <u>A</u> pply

2. Select the **Timeout** tab. For **Timeout** of **Heartbeat**, specify a value calculated by "A+B+30" ("Time that the multi-target monitor resource requires to detect an error"+30 seconds).

A: **Interval** of the monitor resource being monitored by the multi-target monitor resource for NP resolution x (**Retry Count**+1)

* Among three monitor resources, select the monitor resource whose calculation result is the largest.

B: Interval of the multi-target monitor resource x (Retry Count+1)

Note: If **Timeout** of **Heartbeat** is shorter than the time that the multi-target monitor resource requires to detect an error, a heartbeat timeout will be detected before starting the NP resolution processing. In this case, the same service may start doubly in the cluster because the service also starts on the standby server.

🔬 [Cluster 1] Cluster Properties 🗙		
Alert Log Delay Warning Disk Mirror Disk Account RIP(Legacy) Migratic		
Info Interconnect NP Resolution Timeout Port No. Monitor Recovery	Alert Service WebManager	
Network initialization complete wait time	3 min	
Server Sync Wait Time	5 min	
_ Heartbeat		
I <u>n</u> terval	3 sec	
Iimeout	270 sec	
Server Internal Timeout	180 sec	
	Initialize	
	OK Cancel Apply	

3. Click OK.

- 5) Applying the settings and starting the cluster
 - 1. After all settings are complete, click the icon to apply the settings under the menu.

http://10.5.0.120:29003/main.htm	
<u>Eile ⊻iew E</u> dit <u>H</u> elp	
Config Mode 💌 📹 🕻	
Cluster1	Name Servers
minode-2	Groups Monitors
• Croups	
Monitors	
Type Received Time	Time 👽 Server Name Module Name Event ID
4	II
he dialog bo	to confirm to restart the manager is displayed.
\$	
Apply the changes. To apply the changes, the f	lowing operations must be performed.
Restart the manager	
Do you want to perform the	perations?
Sele <u>c</u> t IP	OK Cancel
Click OK .	
	an the following dieles have
JICK UN agai	on the following dialog box.
Cluster Bu	ier X
The application fin	hed successfully.
Restart the WebM	ager.
OK	
Change the m	ode to Operation Mode and click Start Cluster from the Service menu
6	Cluster Manager - Windows Internet Explorer
http://10.5.0.120:29003/main.htm	2
Eile View Service Tool Help	
Coperatio Suspend Cluster Resume Cluster	
Stopped Start Cluster	
Stop Cluster Restart Manager	

2.

3. 4.

5.

Туре

Received Time

Time 🛡

Server Name Module Name Event ID

4.4 Verifying the created environment

Verify whether the created environment works properly by generating a (dummy) monitoring error to fail over a failover group.

If the cluster is running normally, the verification procedure is as follows:

- 1. Start the failover group (failover1) on the active node (node1). In the Status tab on the Cluster WebUI, confirm that **Group Status** of failover1 of node-1 is **Normal**.
- 2. Change **Operation Mode** to **Verification Mode** from the Cluster WebUI pull-down menu.
- 3. In the Status tab on the Cluster WebUI, click the **Enable dummy failure** icon of azureppw1 of Monitors.
- 4. After the Azure probe port resource (azurepp1) activated three times, the failover group (failover1) becomes abnormal and fails over to node-2. In the Status tab on the Cluster WebUI, confirm that Group Status of failover1 of node-2 is Normal. Also, confirm that access to the frontend IP and port of the Azure load balancer is normal after the failover.

Verifying the failover operation in case of a dummy failure is now complete. Verify the operations in case of other failures if necessary.

Chapter 5 Cluster Creation Procedure (for an HA Cluster Using an Internal Load Balancer)

5.1 Creation example

This guide introduces the procedure for creating a 2-node unidirectional standby cluster using EXPRESSCLUSTER. This procedure is intended to create a mirror disk type configuration in which node-1 is used as an active server.

The following tables describe the parameters that do not have a default value and the parameters whose values are to be changed from the default values.

5,	mmon to node-1 and node-2)
Setting item	Setting value
Resource group setting	
Name	TestGroup1
Resource group location	Japan East
Virtual network setting	
Name	Vnet1
Address space	10.5.0.0/24
Subnet name	Vnet1-1
Subnet address range	10.5.0.0/24
Resource group name	TestGroup1
Location	Japan East
Load balancer setting	
Name	TestLoadBalancer
Туре	Internal
Virtual network	Vnet1
Subnet	Vnet1-1
IP address assignment	Static
Private IP address	10.5.0.200
Resource group	TestGroup1
Location	Japan East
Backend pool: Name	TestBackendPool
Associated to	Availability set
Target virtual machine	node-1
	node-2
Network IP configuration	10.5.0.120
	10.5.0.121
Health probe: Name	TestHealthProbe
Health probe: Port	26001
Load balancing rule:	TestLoadBalancingRule
Name	
Load balancing rule: Port	80 (Port number offering the operation)
Load balancing rule:	8080 (Port number offering the operation)
Backend port	

• Microsoft Azure settings (common to node-1 and node-2)

• Microsoft Azure settings (specific to each of node-1 and node-2)

Setting item	Setting value	
	node-1	node-2
Virtual machine setting		
VM disk type	HDD	
User name	testlogin	
Password	PassWord_123	
Resource group name	TestGroup1	

Location	Japan East			
Storage account setting				
Name	clstorageacc1			
Performance	Standard			
Replication	Locally-redundant storage (LRS	5)		
Network security group sett	ing			
Name	NetSecGroup-1			
Availability set setting				
Name	AvailabilitySet-1			
Update domains	5			
Fault domains	3			
Diagnostics storage account setting				
Name	clstorageaccdiag1			
Performance	Standard			
Replication	Locally-redundant storage (LRS)			
IP configuration setting				
IP address	10.5.0.120 10.5.0.121			
Blob storage setting				
Name	Node-1Blob Node-2Blob			
Source type	New (empty disk)			
Account type	Standard (HDD)			
Size	20			

• EXPRESSCLUSTER settings (cluster properties)

Setting item	Setting value	
	node-1	node-2
Cluster name	Cluster1	
Server name	node-1	node-2
NP Resolution Tab: Type	Ping	
NP Resolution Tab: Ping	10.5.0.5	
Target		
NP Resolution Tab:	Use	Use
<server> column</server>		

• EXPRESSCLUSTER settings (failover group)

Resource name	Setting item	Setting value	
Mirror disk resource	Nama	md	
	Details Tab: Data Partition	G:	
	Drive Letter		
	Details Tab: Cluster Partition	F:	
	Drive Letter		
Azure probe port resource	Name	azurepp1	
	Probe port	26001 (Value specified for	
		Port of Health probe)	

• EXPRESSCLUSTER settings (monitor resource)

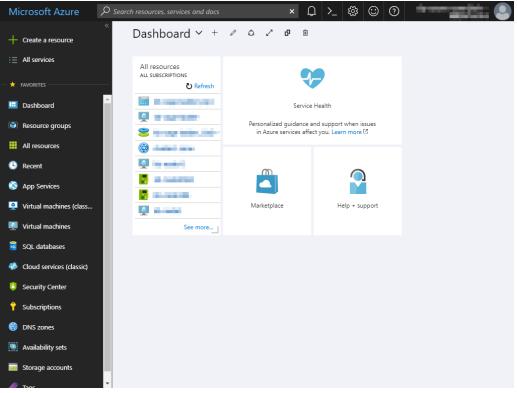
Monitor resource name	Setting item	Setting value
Mirror disk monitor	-	-
resource		
Azure probe port monitor	Name	azureppw1
resource	Recovery Target	azurepp1
Azure load balance	Name	aurelbw1
monitor resource	Recovery Target	azurepp1

5.2 Configuring Microsoft Azure

1) Creating a resource group

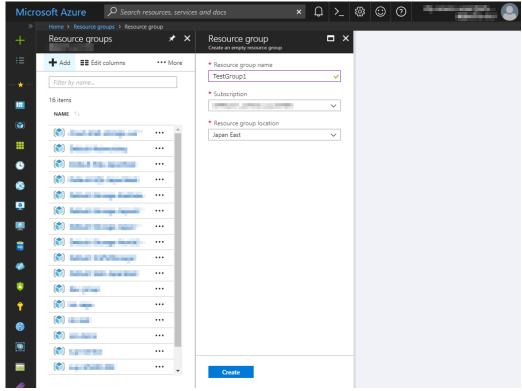
Log in to the Microsoft Azure portal (https://portal.azure.com/) and create a resource group following the steps below.

1. Select **Resource groups** or the resource group icon in the menu on the left side of the window. If there are existing resource groups, they are displayed in a list.



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Ŷ						apan East		
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				1000.000		apan East		
				participants		apan East		

3. Specify Resource group name, Subscription, and Resource group location, and click Create.

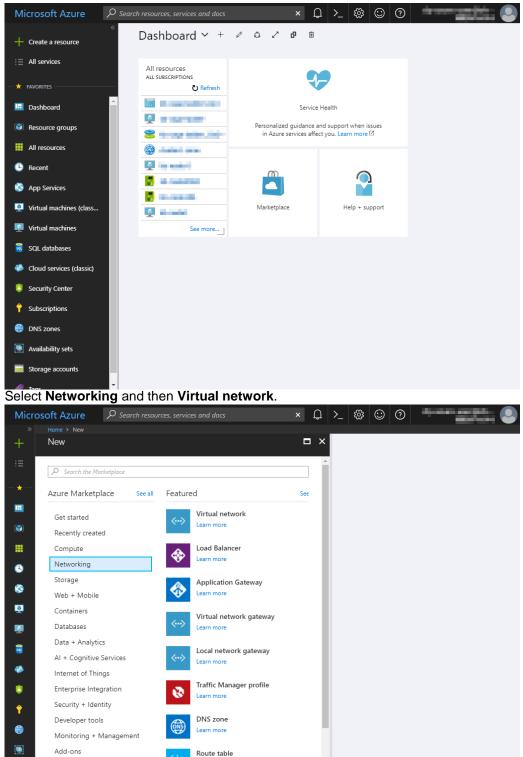


2) Creating a virtual network

2.

Log in to the Microsoft Azure portal (https://portal.azure.com/) and create a virtual network following the steps below.

1. Select +Create a resource or the + icon in the menu on the left side of the window.

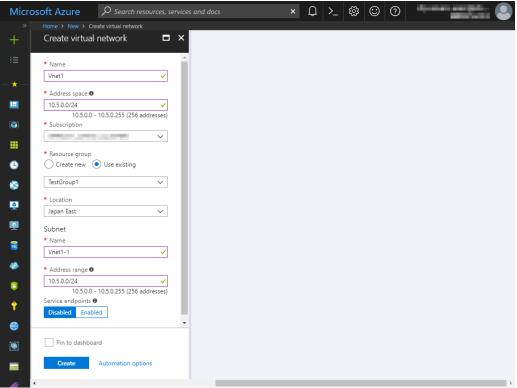


Learn more

ExpressRoute

Blockchain

3. Specify Name, Address space, Subscription, Resource group name, Location, Name of Subnet, and Address range, and click Create.



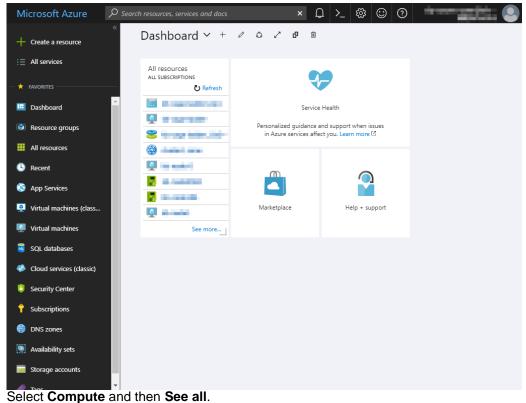
3) Creating a virtual machine

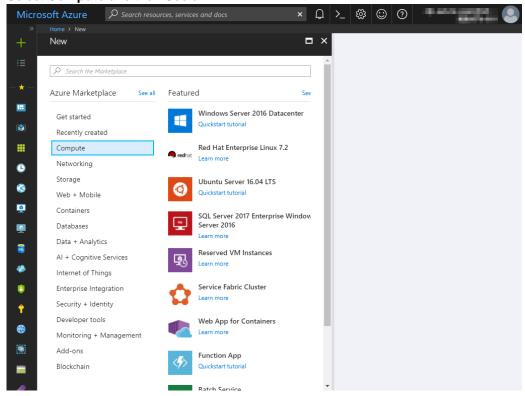
2.

Log in to the Microsoft Azure portal (https://portal.azure.com/) and create virtual machines and disks following the steps below.

Create as many virtual machines as required to create a cluster. Create node-1 and then node-2.

1. Select +Create a resource or the + icon in the menu on the left side of the window.





- 3. Select Windows Server 2016 Datacenter.
- 4. The Basics blade is displayed. Specify Name, VM disk type, User name, Password, Confirm password, Subscription, Resource group name, and Location, and click OK. For Name, specify node-1 for node-1 and node-2 for node-2.

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+	Create	virtual machine	×	Basics		×		
:≡ ^ _★_	1	Basics Configure basic settings	>	* Name node-1	~	^		
	2	Size Choose virtual machine size	>	VM disk type ● HDD * User name testlogin	~			
•	3	Settings Configure optional features	>	* Password	 			
©	4	Summary Windows Server 2016 Datacent	> er	* Confirm password •••••• Subscription	~			
				* Resource group 🖲 Create new 💿 Use existing	~			
•				TestGroup1	\sim			
•				* Location Japan East	\sim			
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5. The **Choose a size** blade is displayed. Select the size appropriate for the usage purpose of the virtual machines from the list and click **Select**. In this guide, **A1 Standard** is selected.

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- 6. The Settings blade is displayed. Specify Availability set, Storage account, Public IP address, Network security group, and Diagnostics storage account.
- 7. Select No for Use managed disks.

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+ ·	Create virtual machine 1 Basics Done 2 Size Done 3 Settings Configure optional features	, ,	High availability Availability zone (Preview) • Nore No availability zones are available for the location you have selected. Current supported locations are: East US 2, Central US, West Europe. * Availability set • None
© 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	4 Summary Windows Server 2016 Datacenter		Storage Use managed disks Vo Yes * Storage account devgroupdisks149 Network
** • •			* Virtual network • > > Vnet1 > > * Subnet • > > Vnet1-1 (10.5.0.0/24)
			* Public IP address

8. Return to the **Settings** blade and select **Availability set**. For node-1, the **Change availability set** blade is displayed. Select **Create new**. Specify **Name**, **Fault domains**, and Update **domains**, and click **OK**. For node-2, the **Change availability set** blade is displayed. Select AvailabilitySet-1 created for node-1

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Iocations are: East Europe. * Availability set None Storage Use managed disk No Ye * Storage account devgroupdisks Network * Virtual network Vnet1 * Subnet	5 0 5 5 5 5 5 149 >		You can create a new availability set or select an existing availability set in the same location and resource group as the VM. Create new None None		* Name AvailabilitySet-1 Fault domains • • Update domains • • • Use managed disks • No (Classic) Yes (Aligned)
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Select Storage account. For node-1, the Create storage account blade is displayed. Specify Name, Performance, and Replication, and click OK. For node-2, the Choose storage 9. account blade is displayed. Select clstorageacc1 created for node-1.

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- Return to the Settings blade and select Public IP address.
 The Choose public IP address blade is displayed. Select None. Ignore the Create public IP address blade.

12. Return to the **Settings** blade and select **Network security group**. For node-1, the **Create network security group** blade is displayed. Specify **Name** and click **OK**. For node-2, the **Choose network security group** blade is displayed. Select NetSecGroup-1 created for node-1.

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≡ ► —	Storage Use managed disks No Yes * Storage account	^	These are the network security groups in the selected subscription and location 'Japan Eat'.	^	* Name NetSecGroup-1 Inbound rules @
2	dstorageacc1 Network	ł	+ Create new		1000: default-allow-rdp Any SDP (TCP/3389) + Add an inbound rule
>	* Virtual network Vnet1		None None		Outbound rules
8	* Subnet • > Vnet1-I (10.5.0.0/24)				+ Add an outbound rule
	* Public IP address > None				
2	* Network security group (firewall) • > (new) node-1-nsg				
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13. Select Storage account. For node-1, the Create storage account blade is displayed. Specify Name, Performance, and Replication, and click OK. For node-2, the Choose storage account blade is displayed. Select clstorageaccdiag1 created for node-1.

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- 14. Return to the Settings blade and click OK.

15. The **Create** blade is displayed. Check the contents displayed on the **Create** blade and click **Create** if the contents are correct.

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4) Setting a private IP address

Log in to the Microsoft Azure portal (https://portal.azure.com/) and change the private IP address setting following the steps below. Since an IP address is initially set to be assigned dynamically, change the setting so that an IP address is assigned statically. Change the settings of node-1 and then node-2.

1. Select **Resource groups** or the resource group icon in the menu on the left side of the window.

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Virtual machines	See more.			
👼 SQL databases				
Cloud services (clas	ic)			
Security Center				
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DNS zones				
Availability sets				
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2. Select TestGroup1 from the resource group list.

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3. The summary of TestGroup1 is displayed. Select virtual machine node-1 or node-2 from the item list.

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nt Deployments			clstorageaccdiag1			Stora	ge account	st	apan
Policies			NetSecGroup-1			Netw	ork security gro	up Ja	apan
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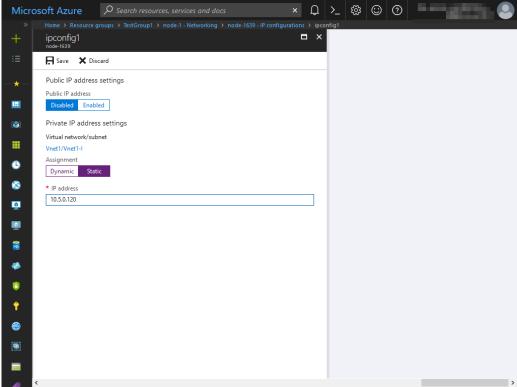
5. Select a network interface displayed in the list. The network interface name is generated automatically.

4.

6. Select IP configurations.

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Ŷ	SUPPORT + TROUBLESHOOTING			
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- 7. Only ipconfig1 is displayed in the list. Select it.
- Select Static for Assignment under Private IP address settings. Enter the IP address to be assigned statically in the IP address text box and click Save at the top of the window. The IP address of node-1 is 10.5.0.120. The IP address of node-2 is 10.5.0.121.



9. The virtual machines restart automatically so that new private IP addresses can be used.

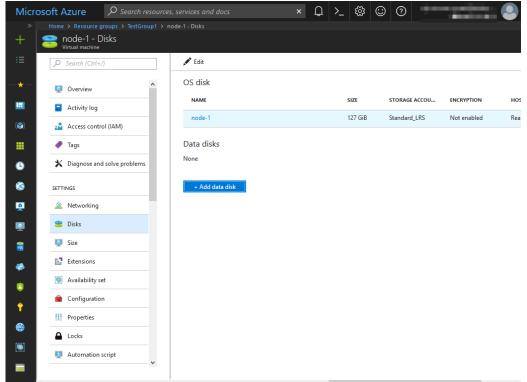
5) Adding Blob storage Log in to the Microsoft Azure portal (https://portal.azure.com/) and add Blob storage to be used for a mirror disk (cluster partition or data partition). Change the settings of node-1 and then node-2.

1. Select **Resource groups** or the resource group icon in the menu on the left side of the window.

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2.

- 3. The summary of TestGroup1 is displayed. Select virtual machine node-1 or node-2 to which to add Blob storage from the item list and select **Disk**.
- 4. Select +Add data disk.



5. The Attach unmanaged disk blade is displayed. Click Browse right to the Storage container text box. For Name and Storage blob name, the automatically generated default values are entered.

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	roups > TestGroup1 > node-1 - Disks > Attach unmanaged disk						
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* Name							
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New (empty disk)						\sim	
* Account type 🖲							
Standard (HDD)						~	
* Size (GiB) • 1023							
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Throughput limit (*							
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node-1-20180220-	152753.vhd					~	
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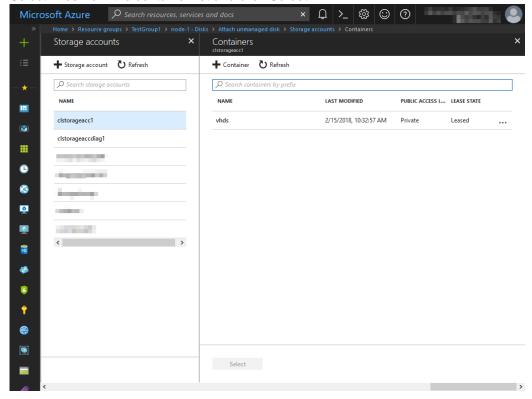
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	NAME	ТҮРЕ	RESOURCE GROUP
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	clstorageaccdiag1	Standard-LRS	TestGroup1
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6. Select clstorageacc1 from the storage account list.

7. S

Select vhds from the container list and click **Select**.



8. The Attach unmanaged disk blade is displayed again. Specify Name, Source type, Account type, Size, and Storage blob name, and click OK. For Name, specify Node-1Blob1 for node-1 and Node-2Blob1 for node-2. For Storage blob name, specify Node-1Blob1.vhd for node-1 and Node-2Blob1.vhd for node-2.

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9.

6) Configuring virtual machines

Log in to the created node-1 and node-2 and specify the settings following the procedure below. Set a partition for the mirror disk resource. Create a file system in the added Blob storage. For details about a partition for the mirror disk resource, see "Partition settings for mirror disk resource (when using Replicator)" in "Settings after configuring hardware" in Chapter 1, "Determining a system configuration" in the *Installation and Configuration Guide*.

1. Open the **Disk Management** window. The **Initialize Disk** dialog box is displayed.

Initialize Disk	:
You must initialize a disk before Logical Disk Manager can access it. Select disks: [2] Disk 2	
Use the following partition style for the selected disks: MBR (Master Boot Record) GPT (GUID Partition Table) Note: The GPT partition style is not recognized by all previous versions of Windows.	
OK Cancel	

2. Confirm that the added disk is displayed as "Disk 2" in unassigned state under the existing C drive and D drive.

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<u>File Action V</u> i	ew <u>H</u> elp								
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Volume	Layout	Туре	File System	Status	Capacity	Free Spa	% Free		
🧰 (C:)	Simple	Basic	NTFS	Healthy (S	127.00 GB	113.12 GB	89 %		
🖛 Temporary Stora	ag Simple	Basic	NTFS	Healthy (P	70.00 GB	68.77 GB	98 %		
Disk 0 Basic	(C)			7/7////////////////////////////////////		///////////////////////////////////////	7/7/7/7/	7777	77777
127.00 GB	127.00 GB NTFS								
Online	Healthy (System,	Boot, Active,	Crash Dump, P	rimary Partition	5//////////////////////////////////////				
Tisk 1									
Basic	Temporary Stora	ge (D:)							-
70.00 GB Online	70.00 GB NTFS	-							
Unline	Healthy (Page File	, Primary Pa	rtition)						
	1								
- Disk 2									
Basic									
20.00 GB Online	20.00 GB Unallocated								
onnie	Unanocated								
	1								
Unallocated	Primary partition								

Create a cluster partition. Right-click "Disk 2" and select New Simple Volume.
 The Welcome to the New Simple Volume Wizard is displayed. Click Next.

New Simple Volume Wizard		х
	Welcome to the New Simple Volume Wizard	
	This wizard helps you create a simple volume on a disk.	
	A simple volume can only be on a single disk.	
	To continue, click Next.	
	< <u>B</u> ack <u>N</u> ext > Cancel	

5. The **Specify Volume Size** window is displayed. Allocate 1024 MB (1,073,741,824 bytes) or more to a cluster partition. Click **Next**.

Specify Volume Size Choose a volume size that is between	en the maximum and minimum sizes.
Maximum disk space in MB:	20477
Minimum disk space in MB:	8
Simple volume size in MB:	1024
	< Back Next > 0

6. The Assign Drive Letter or Path window is displayed. Select the F drive for Assign the following drive letter:. Use the disk as a raw partition without formatting.

New Simple Volume Wizard			×
Assign Drive Letter or Path For easier access, you can assign a drive let	ter or drive path	to your partition.	
Assign the following drive letter: Mount in the following empty NTFS folder Do not assign a drive letter or drive path	F Brows	v	
	< <u>B</u> ack	<u>N</u> ext >	Cancel

- 7. Next, create a data partition. Right-click "Disk 2" and select **New Simple Volume**.
- 8. The Welcome to the New Simple Volume Wizard is displayed. Click Next.
- 9. The Specify Volume Size window is displayed. Click Next.

New S	imple Volume Wizard		×
Spe	e cify Volume Size Choose a volume size that is between the r	maximum and minimum sizes.	
	Maximum disk space in MB:	19453	
	Minimum disk space in MB:	8	
	Simple volume size in MB:	19453	
		< Back Next > Cancel	

10. The Assign Drive Letter or Path window is displayed. Select the G drive for Assign the following drive letter: and click Next.

	0	
	New Simple Volume Wizard	×
	Assign Drive Letter or Path For easier access, you can assign a drive letter or drive path to your partition.	
	Assign the following drive letter: Mount in the following empty NTFS folder: Do not assign a drive letter or drive path	
11.	Cancel The Format Partition window is displaye New Simple Volume Wizard	ed. Confirm that File System is NTFS .
	Format Partition To store data on this partition, you must format it first.	`
	Choose whether you want to format this volume, and if so, what settings you want to use.	
	O Do not format this volume	
	Format this volume with the following settings:	
	Ele system: VTFS V	
	Allocation unit size: Default ~	
	Volume label: New Volume	
	Perform a quick format	
	Enable file and folder compression	
	< Back Next > Cancel]

 Click Next.
 The Completing the New Simple Volume Wizard window s displayed. Check the displayed contents and click Finish.

New Simple Volume Wizard		Х
	Completing the New Simple Volume Wizard	
	You have successfully completed the New Simple Volume Wizard.	
	You selected the following settings: (Volume the: Single Yolume Dick selected: Dick 2 Volume size: 19453 MB Drive letter or path: G: File system: NTFS Allocation unit size: Default Volume labe! New Volume (2 aick format: Yea To close this wizard, click Finish.	
	< Back Finish Cancel	

14. Confirm that the added disks are assigned as the F drive and G drive.

📅 Disk Manage	ement						-	×
<u>File</u> <u>A</u> ction	<u>V</u> iew <u>H</u> elp							
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/olume	Layout	Туре	File System	Status	Capacity	Free Spa	% Free	
🗰 (C:)	Simple	Basic	NTFS	Healthy (S	127.00 GB	111.94 GB	88 %	
- (F:)	Simple	Basic	RAW	Healthy (P	1.00 GB	1.00 GB	100 %	
New Volume	(G:) Simple	Basic	NTFS	Healthy (P	19.00 GB	18.94 GB	100 %	
🖷 Temporary St	torag Simple	Basic	NTFS	Healthy (P	70.00 GB	68.77 GB	98 %	
- Disk 0								
	(C:) 127.00 GB NTF Healthy (Syster		ve, Crash Dump	o, Primary Partition)			
127.00 GB	127.00 GB NTF	n, Boot, Actir orage (D:)		o, Primary Partition)			
127.00 GB Online Disk 1 Basic 70.00 GB Online Disk 2	127.00 GB NTF Healthy (Syster Temporary St 70.00 GB NTFS	n, Boot, Actir orage (D:)		, Primary Partition				
127.00 GB Online Disk 1 Basic 70.00 GB Online	127.00 GB NTF Healthy (Syster Temporary St 70.00 GB NTFS	n, Boot, Actir orage (D:) File, Primary	Partition)	, Primary Partition New Volume (G:) 19.00 GB NTFS Healthy (Primary P				
Disk 1 Basic T0.00 GB Online Disk 2 Basic 20.00 GB Online	Temporary St 70.00 GB NTFS Healthy (Syster 70.00 GB NTFS Healthy (Page (F:) 1.00 GB RAW	n, Boot, Acti orage (D:) File, Primary	Partition)	New Volume (G:) 19.00 GB NTFS				

7) Configuring a load balancer

Log in to the Microsoft Azure portal (https://portal.azure.com/) and add an internal load balancer following the steps below.

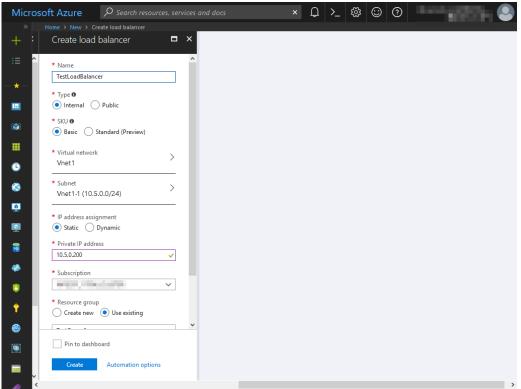
For details, see the following websites:

- Azure Load Balancer overview
 https://docs.microsoft.com/en-us/azure/load-balancer/load-balancer-overview
- Create an Internal load balancer in the Azure portal https://docs.microsoft.com/en-us/azure/load-balancer/load-balancer-get-started-ilb-arm-portal
- 1. Select +Create a resource or the + icon in the menu on the left side of the window.

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- 2. Select Networking and then Load balancer.

- 3. The **Create load balancer** blade is displayed. Specify **Name**.
- 4. Select Internal for Type.
- 5. For Virtual network and Subnet, select the virtual network and subnet created in "2)Creating a virtual network"
- 6. Specify IP address assignment, Private IP address, Subscription, Resource group, and Location, and click Create. Deploying the load balancer starts. This processing takes several minutes.



 8) Configuring a load balancer (configuring a backend pool)
 1. Associate a virtual machine registered to the availability set to the load balancer. After the load balancer has been deployed, select Resource groups or the resource group icon in the menu on the left side of the window.

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Virtual machines		See more			
SQL databases					
Cloud services (classic)				
Security Center					
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Storage accounts					
Dor.	-				

2. Select the resource group to which the created load balancer belongs from the resource group list.

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	17 items						
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3. The summary of the selected resource group is displayed. Select the created load balancer from the item list.

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Deployments		clstorageaccdiag	j1		Storage account	Japan B
Policies		NetSecGroup-1			Network security grou	ıp Japan E
Properties		node-1			Virtual machine	Japan B
Locks		node-1639			Network interface Virtual machine	Japan B
👱 Automation scri	pt	node-2			Network interface	Japan B Japan B
		TestLoadBalance	r		Load balancer	Japan B
MONITORING		<↔ Vnet1			Virtual network	Japan B
Alert rules						
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ect Backend p icrosoft Azure Home > Resource grou Load balancer C Search (Ctrl+/) Overview	© Search resources, servic 25 > TetGroup1 > TetLoadBal Incer - Backend pools + 5	ancer - Backend pools Add Č Refresh	nools	- 🐯 😳		P ADDRESS
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Constant of the second	Search resources, servic Search resources, servic TestGroup1 > TestGoadBa ncer - Backend pools H	ancer - Backend pools Add U Refresh C Search backend address p IRTUAL MACHINE	nools			P ADDRESS
ect Backend p icrosoft Azure // TestLoadBala Load bitancer // Cverview Activity log Serrinks Frontend IP con Backend pools Frontend IP con Backend pools Frontend IP con	Search resources, servic Search resources, servic TestGroup1 > TestGoadBa ncer - Backend pools +	ancer - Backend pools Add U Refresh C Search backend address p IRTUAL MACHINE	nools			P ADDRESS
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ect Backend p icrosoft Azure // TestLoadBala Load bitancer // Cverview Activity log Serrinks Frontend IP con Backend pools Frontend IP con Backend pools Frontend IP con	Search resources, servic TestGroup1 > TestLoadBa ncer - Backend pools	ancer - Backend pools Add U Refresh C Search backend address p IRTUAL MACHINE	nools			P ADDRESS
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Cect Backend p icrosoft Azure Home > Resource grouter and the second point of the second	Search resources, servic Search resources, servic TestGroup1 > TestLoadBa ncer - Backend pools	ancer - Backend pools Add U Refresh C Search backend address p IRTUAL MACHINE	nools			P ADDRESS
Cect Backend p icrosoft Azure Home > Resource grouter and the second point of the second	Search resources, servic Search resources, servic TestGroup1 > TestLoadBa ncer - Backend pools	ancer - Backend pools Add U Refresh C Search backend address p IRTUAL MACHINE	nools			P ADDRESS

5. Click Add.

4.

- 6. The Add backend pool blade is displayed. Specify Name.
- 7. For Associated to, select Availability set.
- 8. Specify Availability set.
- 9. Click Add a target network IP configuration.
- 10. Specify the target virtual machine for Target virtual machine and Network IP configuration.

Repeat steps 9 and 10 as many times as the number of target virtual machines.
 Click **OK**.

Micros	oft Azure	€ Search	resources, service	es and docs	× Q	>_	ŝ	\odot	?	And the second s	
+ :	Add backer TestLoadBalancer	nd pool				×					
∷≡	* Name										
- *	TestBackendPo	ool			~						
— × —	IP version										
	IPv4	IPv6									
	Associated to 0										
	Availability set	t			\sim						
	Availability set 6	•									
(1)	AvailabilitySet-	-1 tual machines: 2			~						
Q Q	virtual machin Network IP confi	ne: node-1	to it. e-1639/ipconfig1 (10).5.0.120)	 Ō						
0	* Target virtua	al machine O			Ō						
\$	node-2 size: Standar	d_A1, network in	terfaces: 1		\sim						
<u> </u>	* Network IP of	configuration 0									
†	ipconfig1 (10	0.5.0.121)			\sim						
6		+	Add a target networ	k IP configuration							
	ОК										
A <											>

9) Configuring a load balancer (configuring a health probe)
1. Select Health probes.

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icrosoft A	zure					×Û	>_ 🐯	0	1000 BRA	
		lancer - Health prob								
Te	estLoadBa	alancer - Hea	th prob	bes						≯
<u>ک</u>	Search (Ctrl+/)		🕂 Add						
	Overview		•	${\cal P}$ Search probes						
	Activity log			NAME	Υţ	PROTOCOL	°↓ PORT	°↓ USED BY	τĻ	
28	Access contro	ol (IAM)		No results.						
	Tags									
×	Diagnose and	solve problems								
SETTIN	IGS									
	Frontend IP c	onfiguration								
	Backend poo	ls								
P	Health probe	s								
<u>=</u>	Load balancir	ng rules								
	Inbound NAT	rules								
<u>+1</u> +	Properties									
	Locks									
	Automation s	cript								
MONIT	TORING									
	Diagnostics le	ogs	-							

- 2. Click Add.
- 3. The Add health probe blade is displayed. Specify Name.
- 4. Specify **Protocol** and **Port**, and click **OK**.

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»					_				
+	Add health pro	obe	C	×					
÷≡	* Name			_					
- * -	TestHealthProbe			~					
	IP version IPv4								
	Protocol	_							
	HTTP TCP								
•••	26001			~					
	* Interval								
	5		seco	onds					
<u> </u>	* Unhealthy thresho	old 🛛							
Q	2		consecutive fail	ures					
2									
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10) Configuring a load balancer (setting the load balancing rules)
1. Select Load balancing rules.

OCICC	Load balancing	Tuic	з.							
			, services and docs		×	Д :	>_ 🐯	0		
>>	Home > TestLoadBalancer - Load ba	lancing rul								
+	TestLoadBalancer - Lo	ad bala	incing rules							* ×
∷≡			Add							
-*-	💠 Overview	^	Search load bo	alancing ru ↑↓	les	RILLE 14	BACKEND PO	ol 차	HEALTH PROBE	Ťψ
	Activity log		No results.				BACKEND TO		next in those	
	Access control (IAM)		No results.							
	🔎 Tags									
•	X Diagnose and solve problems									
۵	SETTINGS									
<u>.</u>	Frontend IP configuration									
	Backend pools									
) III	Health probes									
49	🗮 Load balancing rules									
O	Inbound NAT rules									
Ŷ	Properties	_								
8	Locks	-								
	Automation script	-								
	MONITORING									
	-	~								

- 2. Click Add.
- The Add load balancing rule blade is displayed. Specify Name. Specify Port and Backend port, and click OK. 3.
- 4.

Microsoft Azure	${\cal P}$ Search resources, services and docs	× Q	>_ ऄ	0	
>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>			_		
+ Add load ba TestLoadBalancer	lancing rule		<		
IP Version	vб		<u> </u>		
→ Frontend IP add					
1	adBalancerFrontEnd)	~			
	90				
* Port					
Backend port					
8080	,	~			
Backend pool					
TestBackendPoo	ol (2 virtual machines)	~			
Health probe 🛛					
TestHealthProb	e (TCP:26001)	~			
Session persisten	te 0				
- None		~			
Idle timeout (min	utes) 0	4			
Floating IP (direct					
	bled				
			•		
ОК					
A 4					>

11) Adjusting the OS startup time, checking the network setting, checking the firewall setting, synchronizing the server time, and disabling the power saving function. For each procedure, see "Settings after configuring hardware" in Chapter 1, "Determining a system configuration" in the *Installation and Configuration Guide*.

12) Installing EXPRESSCLUSTER

For the installation procedure, see the *Installation and Configuration Guide*. After installation is complete, restart the OS.

13) Registering the EXPRESSCLUSER license

For the license registration procedure, see the Installation and Configuration Guide.

5.3 Configuring the EXPRESSCLUSTER settings

Configure the following on the WebManager cluster generation wizard. For the WebManager setup and connection procedures, see Chapter 5, "Creating the cluster configuration data" in the *Installation and Configuration Guide*.

This section describes the procedure to add the following resources and monitor resources:

- Mirror disk resource
 - Azure probe port resource
 - Azure probe port monitor resource
 - Azure load balance monitor resource
 - · PING network partition resolution resource (for NP resolution)

For the settings of other resources and monitor resources, see the *Installation and Configuration Guide* and the *Reference Guide*.

1) Creating a cluster

Start the cluster generation wizard to create a cluster.

- Creating a cluster
 - 1. Access WebManager. Then, the following dialog box is displayed. Click **Start cluster generation wizard**.

<u></u>	Confirm
The clu	ister is not constructed.
	Start cluster generation wizard.
	Import cluster configration file.
	Close

2. The following dialog box is displayed. Click Start Cluster Generation Wizard for standard edition.



 The Cluster Definition page is displayed. Enter a desired name in Cluster Name. Select an appropriate language in Language. After the setting is applied, the display language of WebManager is changed to the selected language.

<u>\$</u>	Cluster Generation Wizard
Steps	Cluster Definition
	Cluster Name Cluster1
Server	Comment
Basic Settings	Language English 👻
Interconnect	Management IP Address
NP Resolution	
Group	
Monitor	
	Description
	Start generating the cluster. Enter the cluster name, and then select the language (locale) of the environment that runs WebManager.
	If using the integrated WebManager to manage multiple clusters, specify a unique cluster name to identify the cluster. The management IP address is a floating IP address used for a WebManager connection. If establishing connections by
	specifying each server IP address, the management IP address can be omitted. To continue, click [Next].
	< <u>B</u> ack <u>N</u> ext > Cancel

4. The Server Definition page is displayed.

The instance connected to WebManager is displayed as a registered master server. Click **Add** to add the remaining instances (by specifying the private IP address of each instance).

Add Server X
Server Name or IP Address:
10.5.0.121
Description Enter an IP address or a server name. When entering a server name, name resolution is necessary. Both IPv4 and IPv6 for IP address can be used. When entering an IP address, the server name is automatically acquired.
OK Cancel

5. Click Next.

<u>چ</u>		Cluster Generation Wizard		×
Steps	Server Definition			
	Server Definition L			
💙 Cluster	Order	Name		Add
🕒 Server	Master Server 1	node-1 node-2		Remove
🕏 Basic Settings				
Interconnect				
NP Resolution				
Group				
Monitor	Click "Up" or "Dow	finition servers constructing the cluster. 1° to change the server priority. configure the server group when using the server group.		Up Dgwn Settings
			< <u>B</u> ack	Next > Cancel

6. The **Interconnect** page is displayed.

Specify the IP addresses (IP address of each instance) to be used for interconnect. In addition, select mdc1 for **MDC** as a communication path of a mirror disk resource to be created later.

\$				Clus	ter Genera	tion	Wizard				
Steps	[Interconne Interconr									
🛩 Cluster		Priority	Туре		MDC		node-1		node-2		A <u>d</u> d
🕂 Server		1	Kernel Mode	•	mdc1	-	10.5.0.120	-	10.5.0.121	-	<u>R</u> emove
💙 Basic Settings											
😒 Interconnect											
NP Resolution											
Group											
Monitor											
											<u>U</u> p
		4								•	D <u>o</u> wn
		Descriptio Configure		t amoi	ng the server	s con	structing the cluster.Cl	lick "Add	" to add interconnect a	nd sele	ect the type.
		For "Kern		, confi	gure the rout	e whic	h is used for heartbea		lirror Communication C		
		For "Kerne recomme	el mode" setting nded.	, more	than zero ro	utes a	ire necessary to be co	-	. Configuring more tha	n one i	outes is
		Click "Up" servers. F	or "Down" to co	nfigure cation	e the priority t route which	o pret s use	d for data mirroring co	only for	routes. the communication an cation, select the mirror		
									< <u>B</u> ack	<u>N</u> ext :	 Cancel

7. Click Next.

8. The **NP Resolution** page is displayed.

To execute NP resolution by using a ping, click **Add** to add a line to the NP resolution list. Click a cell of the **Type** column and select **Ping**. Click the cell of the **Ping target** column and set the IP address of the device to which to send a ping. Be sure to specify the IP address of a server other than cluster servers within the Microsoft Azure virtual network. Click a cell of each server column and select **Use** or **Not use**.

S	Cli	ster Generation Wiz	ard		x
Steps	NP Resolution				
	NP Resolution List				
🛩 Cluster	Type Ping T		node-2		Add
🖵 Server	Ping 10.5.0.5	Use	Use 🔻		Remove
Basic Settings					<u>P</u> roperties
Interconnect					
⇒ NP Resolution					
Group					
Monitor					
					Tuning
	Description				
	Configure network partition (N	P) resolution function.			
	Click "Add" to add NP resolutio				
	For "COM" setting, click each s For "DISK" setting, click each s			he partition for disk heartbeat.	
	For "Ping" setting, click Ping ta	rget column cell to config			each server column
	cell to configure "Use" or "Do I For "Majority" setting, double-or		cell to configure "Use	e" or "Do not use"	
	For "DISK" and "Ping" settings	the detailed settings ca	n be verified and cha		
	Click "Tuning" to configure the	actions at NP occurrenc	e.		
				< Back	lext > Cancel
Click Noxt					

9. Click Next.

2) Adding a group resource

- Defining a group Create a failover group.
 - 1. The Group List window s displayed.

<u>\$</u>	Cluster Generation Wizard	l	le de la constante de la const
Steps	Group		
🛩 Cluster	Group List Name	Туре	Add
🛩 Server			Remove
💙 Basic Settings			Properties
 Interconnect 			
NP Resolution			Group Resource
Group Monitor			
	Description		
	Configure failover group to be a unit of fail over. Click "Add" to add a group. Click "Properties" to configure the properties of the selecte Click "Group Resource" to add resource to the selected gr		
			< Back Next > Cance

2. The **Group Definition** window is displayed. Specify a failover group name (failover1) for **Name**.

		Group Definition
Steps	Group Definition	
✓ Cluster	<u>T</u> ype	failover
✓ Server		Use Server <u>G</u> roup Settings
눡 Group	Na <u>m</u> e	failover1
🔿 Basic Settings	<u>C</u> omment	
Startup Servers		
Group Attributes		
Group Resources		
Monitor		
	"Failover".	hine resources to cluster virtual machines, select "Virtual machine" as the type. In other cases, select up, check the "Use Server Group".

4. The **Servers that can run the Group** page is displayed. Click **Next** without specifying anything.

\$	Group Definition(failover1)
Steps	Servers that can run the Group
✓ Cluster	Failover is possible on all servers Servers that can run the Group Ayailable Servers
🛩 Server	Servers Servers
눡 Group	j node-1 j node-2
✓ Basic Settings	< A <u>d</u> d
🕏 Startup Servers	<u>R</u> emove >
Group Attributes	
Group Resources	
Monitor	Description Select the server which can run the group and configure the priority of the servers. In case that all the servers which are registered to the duster can start the group, check "Failover is possible at all servers" on. The priority order is the order which was set when the server was registered to the cluster. In case setting individually the server which can start the group, check "Failover is possible at all servers" of. Select the server which can start the group from the "Available Servers" list on the right side, and click" Add' to add the server to "Servers that
	can run the Group" list. Click "Up" or "Down" to change the priority order.

5. The **Group Attribute Settings** page is displayed. Click **Next** without specifying anything.

<u>\$</u>	Group Definition	(failover1)	X
Steps	Group Attribute Settings		
	Startup Attribute		
🛩 Cluster	Auto Startup	Manual Startup	
✓ Server	Failover Attribute		
	Auto Eailover		
눡 Group	 Use the startup server settings 		
🤎 Basic Settings	Failover dynamically Perform a Forced Failover		Edit exclusion monitor
✓ Startup Servers	Prioritize failover policy in the se		
•	Perform a Smart Failover		
😔 Group Attributes	O Prioritize failover policy in the server	r <u>a</u> roup	
Group Resources	Enable only manual failover am	iong the server groups	
Monitor	 Manual Failover 		
	Failback Attribute	Manual Failback	
	Description		
	Configure starting failover group or actions of fa In case not automatically starting the group at c In case selecting the fail over destination consis select "Failover dynamically" in "Auto failover". In the same server group, select "Prioritize the fail	luster startup, set "Startup Attribute" to "Manua dering the status of the monitor resource of ea n case failover using the server group settings	ach server at failure occurrence,
			Back Next > Cancel

6. The **Group Resource** page is displayed.

On this page, add a	i group resource following	the procedure	below.	
<u>\$</u>	Group Definition(faild	ver1)		x
Steps	Group Resource Group Resource List			
🛩 Cluster	Name	Туре		Add
♥ Server				Remove
🕂 Group				
✓ Basic Settings				Properties
✓ Startup Servers				
💙 Group Attributes				
😒 Group Resources				
Monitor	Description Click "Add" to add resources. Click "Properties" to configure the properties of the s	elected resource.		
			< <u>B</u> ack	Finish Cancel

Mirror disk resource

Create a mirror disk resource.

For details, see "Understanding mirror disk resources" in Chapter 5, "Group resource details" in the *Reference Guide*.

- 1. Click Add on the Group Resource List page.
- The esource Definition of Group window is displayed. Select the group resource type (mirror disk resource) from the Type box and enter the group name (md) in the Name box.

<u>\$</u>		Resource Definition of Group(failover1)	
Steps	Group Resource D	efinitions	
🛩 Cluster			
🛩 Server	Type	mirror disk resource	
🕂 Group	Na <u>m</u> e	md	
✓ Basic Settings	Comment		
💙 Startup Servers			Get Licence Info
💙 Group Attributes			
👇 Group Resources			
🔿 Info			
Dependency			
Recovery Operation			
Details			
Monitor	Description		
	Select the type of g	roup resource and enter its name.	
			< Back Next > Canc
lick Next.			

- Resource Definition of Group(failover1) х Steps Eollow the default dependency Dependent Resources Available Resources 🛩 Cluster Name Resource type Name < A<u>d</u>d 🛩 Server <u>R</u>emove > 🕂 Group ✓ Basic Settings ✓ Startup Servers 🛩 Group Attributes 👇 Group Resources 🛩 Info 🔿 Dependency **Recovery Operation** Details Monitor <<u>B</u>ack <u>N</u>ext > Cancel
- 4. The **Dependent Resources** page is displayed. Click **Next** without specifying anything.

 The Recovery Operation at Activity Failure Detection and Recovery Operation at Deactivity Failure Detection page is displayed. Click Next

CIICK Next.				
<u></u>		Resource Definition of Group(failover1)		X
Steps	Execute Script be	fore or after Activation or Deactivation		Settings
🛩 Cluster	Recovery Operation	on at Activity Failure Detection		
✓ Server	Retry Count			3 time
눡 Group	Failover Target S	erver		
✓ Basic Settings	Stable	Server O	Maximum Priority Server	
💙 Startup Servers	Failover <u>T</u> hresho	d		1 time
💙 Group Attributes	Einal Action	No operation (not activate next resource)		-
🛏 Group Resources	Execute Scrip	t before Final Action		Settings
💙 Info	Recovery Operation	on at Deactivity Failure Detection		
💙 Dependency	Retry Count at De	activation Failure		0 time
🔿 Recovery Operation	Final Action	Stop the cluster service and shutdown OS		~
Details	Execute Scrip	t before Final Action		Settings
Monitor				
			< <u>B</u> ack	Next > Cancel

6. The **Details** page is displayed.

Select a server name in the **Name** column of **Servers that can run the group** and click **Add**.

<u></u>	Resource Definition of Group	(failover1)
Steps	Mirr <u>o</u> r Disk No.	1
🛩 Cluster	Data Partition Drive Letter	
🛩 Server	Cluster Partition Drive Letter	
🕂 Group	Cluster Partition Offset Index	0
✓ Basic Settings	Mirror Disk Connect	Select
Startup Servers		
Group Attributes Group Resources	Servers that can run the group Name Data Partition Cluster Partition	< Add Name
✓ Group Resources		Remove > node-1
 Dependency 		
Recovery Operation		
🔿 Details		
Monitor		
		Edit
		Tuning
		< Back Finish Cancel

7. The **Selection of partition** dialog box is displayed. Click **Connect**, select the data partition and cluster partition created in "6)**Configuring virtual machines**", and click **OK**.

		Selection o	f partition		x
Partition					
Data Partitior	n				Cobtain inform
Volume	Disk No.	Partition No.	Size	GU	Connect
	0	1	500MB		Connect
D:\	1	1	71677MB		
F:\	2	1	1024MB		
C:\	0	2	40458MB		
G:\	2	2	19453MB		
4				•	
Cluster Partit	ion				
Volume	Disk No.	Partition No.	Size	GU	
	0	1	500MB		
D:\	1	1	71677MB		
F:\	2	1	1024MB		
C:\	0	2	40458MB		
G:\	2	2	19453MB	and the second se	
•				•	
GUID		-			
L					OK Cancel

8. Perform steps 6 and 7 for node-1 and then node-2 and click Finish.

<u></u>	Resource Definition of Group(fa	ailover1) X
Steps	Mirr <u>o</u> r Disk No.	1
🛩 Cluster	Data Partition Drive Letter	G:
🛩 Server	Cluster Partition Drive Letter	F:
🕂 Group	Cl <u>u</u> ster Partition Offset Index	0
✓ Basic Settings✓ Startup Servers	Mirror Disk Connect	Seject
🛩 Group Attributes	Servers that can run the group	
🕒 Group Resources	Name Data Partition Cluster Partition	< Add Name
❤ Info	node-2	<u>Remove ></u>
Dependency		
Recovery Operation		
😒 Details		
Monitor		
		54
		Edit Tuning
	l	
		< <u>B</u> ack Finish Cancel

• Azure probe port resource

When EXPRESSCLUSTER is used on Microsoft Azure, EXPRESSCLUSTER provides a mechanism to wait for alive monitoring from a load balancer on a port specific to a node in which operations are running.

For details about the Azure probe port resources", see "Understanding Azure probe port resources" in Chapter 5, "Group resource details" in the *Reference Guide*.

1. Click Add on the Group Resource List page.

2. The **Resource Definition of Group** window is displayed. Select the group resource type (Azure probe port resource) from the **Type** box and enter the group name (azurepp1) in the **Name** box.

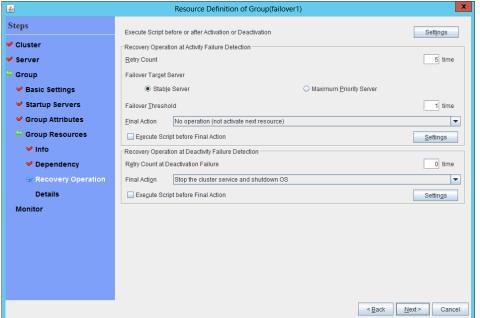
<u></u>	Res	ource Definition of Group(failover1)			x
Steps	Group Resource Definiti	ons			
🛩 Cluster					
✓ Server	<u>T</u> ype	Azure probe port resource			•
🖵 Group	Na <u>m</u> e	azurepp1			
🛩 Basic Settings	Comment				
💙 Startup Servers				Get Licence Info	
💙 Group Attributes				_	
눡 Group Resources					
🗟 Info					
Dependency					
Recovery Operation					
Details	Description				
Monitor	Description				
	Select the type of group	resource and enter its name.			
			< <u>B</u> ack	Next > Cano	:el

3. Click Next.

4. The Dependent Resources page is displayed. Click Next without specifying anything.

<u>گ</u>	Resource Definition of Group(failover1)
Steps	✓ Eollow the default dependency
🛩 Cluster	Dgpendent Resources Available Resources
✓ Server	Name Resource type
🕂 Group	Remove >
✓ Basic Settings	
✓ Startup Servers	
🛩 Group Attributes	
🕒 Group Resources	
🛩 Info	
🗟 Dependency	
Recovery Operation	
Details	
Monitor	
	Back Next> Cancel

5. The Recovery Operation at Activity Failure Detection and Recovery Operation at Deactivity Failure Detection page is displayed. Click Next.



6. For **Probeport**, enter the value specified for **Port** when configuring a load balancer (configuring health probe).

A	F	Resource Definition of Group(failover1)	
Steps			
🛩 Cluster	<u>P</u> robeport	26001	
🛩 Server			
🖰 Group			
✓ Basic Settings			
💙 Startup Servers			
💙 Group Attributes			
👇 Group Resources			
🛩 Info			
Dependency			
Recovery Operation			
🚽 Details			
Monitor			
			Tuning
			< Back Finish Cancel

7. Click Finish.

3) Adding a monitor resource

◆ Azure probe port monitor resource

The port monitoring mechanism for alive monitoring is provided for the node in which the Microsoft Azure probe port resource is running.

For details about the Azure probe port monitor resource, see "Understanding Azure probe port monitor resources" in Chapter 6, "Monitor resource details" in the *Reference Guide*.

Adding one Azure probe port monitor resource creates one Azure probe port monitor resource automatically.

◆ Azure load balance monitor resource

The mechanism to monitor whether the port with the same port number as the probe port is open or not is provided for the node in which the Microsoft Azure probe port resource is not running.

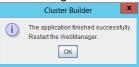
For details about the Azure load balance monitor resource, see "Understanding Azure load balance monitor resources" in Chapter 6, "Monitor resource details" in the *Reference Guide*.

Adding one Azure probe port resource creates one Azure load balance monitor resource automatically.

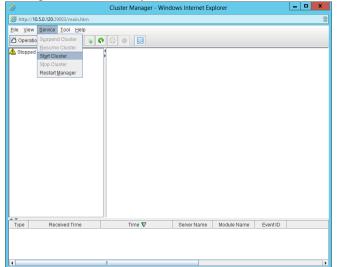
- 4) Applying the settings and starting the cluster
 - 1. After all settings are complete, click the icon to apply the settings under the menu.

http://10.5.0.120:29003/main.htm		
		2
<u>Eile View Edit H</u> elp		
💁 Config Mode 🛛 🖉 🖪	86 88	
ta Citateri	Name Servers Groups Monitors	
Type Received Time	Time Server Name Module Name Event ID	
Type Received Time	л , , , , , , , , , , , , , , , , , , ,	r is disp
Type Received Time	· · · · · · · · · · · · · · · · · · ·	r is disp
Type Received Time Received Time Apply the changes.	to confirm to restart the manager	r is disp
Type Received Time Received Time Apply the changes.	to confirm to restart the manager	r is disp
Type Received Time Received Time Received T	to confirm to restart the manager Cluster Builder	r is disp
Type Received Time Received Time The dialog box 1 Apply the changes. To apply the changes, the follo	to confirm to restart the manager Cluster Builder	r is disp
Type Received Time Received Time Received T	to confirm to restart the manager Cluster Builder	r is disp

- 3. Click **OK**.
- 4. Click **OK** again on the following dialog box.



5. Change the mode to **Operation Mode** and click **Start Cluster** from the **Service** menu.



5.4 Verifying the created environment

Verify whether the created environment works properly by generating a (dummy) monitoring error to fail over a failover group.

If the cluster is running normally, the verification procedure is as follows:

- 1. Start the failover group (failover1) on the active node (node-1). In the Status tab on the Cluster WebUI, confirm that **Group Status** of failover1 of node-1 is **Normal**.
- 2. Change **Operation Mode** to **Verification Mode** from the Cluster WebUI pull-down menu.
- 3. In the Status tab on the Cluster WebUI, click the **Enable dummy failure** icon of azureppw1 of Monitors.
- 4. After the Azure probe port resource (azurepp1) activated three times, the failover group (failover1) becomes abnormal and fails over to node-2. In the Status tab on the Cluster WebUI, confirm that Group Status of failover1 of node-2 is Normal. Also, confirm that access to the frontend IP and port of the Azure load balancer is normal after the failover.

Verifying the failover operation in case of a dummy failure is now complete. Verify the operations in case of other failures if necessary.

Chapter 6 Error Messages

For the error messages related to resources and monitor resources, see the following:

• Chapter 12, "Error messages" in the *Reference Guide*.

Chapter 7 Notes and Restrictions

7.1 HA cluster using Azure DNS

7.1.1 Notes on Microsoft Azure

- There is a tendency for the performance difference (performance deterioration rate) to increase in a multi-tenant cloud environment compared to a physical environment or general virtualization environment (non-cloud environment). Therefore, pay careful attention to this point when designing a performance-oriented system.
- Even if a virtual machine is just shut down, its status is **Stopped** and billing continues. Execute **Stop** on the virtual machine setting window of the Microsoft Azure portal to change the virtual machine state to **Stopped (Deallocated)**.
- An availability set can be set only when creating a virtual machine. To move a virtual machine to and from the availability set, it is necessary to create an availability set again.
- To set up EXPRESSCLUSTER to work with Microsoft Azure, a Microsoft Azure organizational account is required. An account other than the organizational account cannot be used because an interactive login is required when executing the Azure CLI.

7.1.2 Notes on EXPRESSCLUSTER

Please refer the following for notes for EXPRESSCLUSTER on Azure: *EXRESSCLUSTER X Getting Started Guide*

- "Communication port number" in Chapter 5, "Notes and Restrictions"
- "Azure DNS resources" in Chapter 5, "Notes and Restrictions"
- "Setting up Azure DNS resources" in Chapter 5, "Notes and Restrictions" EXRESSCLUSTER X Reference Guide
- "Notes on Azure DNS resources" in Chapter 5, "Group resource details"
- "Notes on Azure DNS monitor resources" in Chapter 6, "Monitor resource details"

Virtual machines are paused for up to 30 seconds for Azure memory preserving maintenance. Please refer the following for details about memory preserving maintenance.

https://docs.microsoft.com/en-us/azure/virtual-machines/windows/maintenance-and-updates

Therefore, it is recommended to set **Heartbeat Timeout** parameter on **Timeout** tab in **Cluster Properties** more than 30 sec.

In addition to Heartbeat Timeout, please also note the following.

• Please set Heartbeat Timeout parameter less than OS reboot time.

Please refer the following about the above:

EXRESSCLUSTER X Getting Started Guide

- "Adjusting OS startup time" in Chapter 5, "Notes and Restrictions" EXRESSCLUSTER X Reference Guide
- "Timeout tab" in Chapter 2, "Functions of the Builder"

7.2 HA cluster using a load balancer

7.2.1 Notes on Microsoft Azure

- There is a tendency for the performance difference (performance deterioration rate) to increase in a multi-tenant cloud environment compared to a physical environment or general virtualization environment (non-cloud environment). Therefore, pay careful attention to this point when designing a performance-oriented system.
- Even if a virtual machine is just shut down, its status is **Stopped** and billing continues. Execute **Stop** on the virtual machine setting window of the Microsoft Azure portal to change the virtual machine state to **Stopped (Deallocated)**.
- An availability set can be set only when creating a virtual machine. To move a virtual machine to and from the availability set, it is necessary to create an availability set again.

7.2.2 Notes on EXPRESSCLUSTER

Please refer the following for notes for EXPRESSCLUSTER on Azure: *EXRESSCLUSTER X Getting Started Guide*

- "Communication port number" in Chapter 5, "Notes and Restrictions"
- "Azure probe port resources" in Chapter 5, "Notes and Restrictions"
- "Setting up Azure probe port resources" in Chapter 5, "Notes and Restrictions"
- "Setting up Azure load balance monitor resources" in Chapter 5, "Notes and Restrictions" EXRESSCLUSTER X Reference Guide
- "Notes on Azure probe port resources" in Chapter 5, "Group resource details"
- "Notes on Azure probe port monitor resources" in Chapter 6, "Monitor resource details"
- "Note on Azure load balance monitor resources" in Chapter 6, "Monitor resource details"

Virtual machines are paused for up to 30 seconds for Azure memory preserving maintenance. Please refer the following for details about memory preserving maintenance.

https://docs.microsoft.com/en-us/azure/virtual-machines/windows/maintenance-and-updates Therefore, it is recommended to set **Heartbeat Timeout** parameter on **Timeout** tab in **Cluster Properties** more than 30 sec.

In addition to Heartbeat Timeout, please also note the following.

• Please set Heartbeat Timeout parameter less than OS reboot time.

Please refer the following about the above:

EXRESSCLUSTER X Getting Started Guide

- "Adjusting OS startup time" in Chapter 5, "Notes and Restrictions"
- EXRESSCLUSTER X Reference Guide
- "Timeout tab" in Chapter 2, "Functions of the Builder"