WebOTX Enterprise Service Bus

November, 2015

NEC Corporation,
Cloud Platform Division,
WebOTX Group
Orchestrating a brighter world

NEC brings together and integrates technology and expertise to create the ICT-enabled society of tomorrow.

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Every day, our innovative solutions for society contribute to greater safety, security, efficiency and equality, and enable people to live brighter lives.
Index

1. What is SOA?

2. WebOTX Enterprise Service Bus
1. What is SOA?
No scratch development / package customizing

From customizing oriented SI to service integration oriented system configuration

System configuration method evolved to composite application with SOA for development term/cost optimization from scratch development.

- **Long development time and high cost**
- **Development risk is comparatively high such as appropriate architecture setup**
- **Effective in systems that generate enterprise unique added value**

- **Difficulty in ver. up after customizing**
- **High cost for unneeded function included in package**
- **Effective for avoiding long implementation time and development risk according to fit level of package**

- **Freer than package**
- **Easy integration with existing systems**
- **Development risk reduction by development mixing services**
4 patterns of SOA implementation

1) Architecture platform
- In case that business systems are slightly different among branch system, HQ system, global system etc, architecture is established enabling to divide core function (core service) from specific function (specific service).
- System integration regarding shared service, M&A, enterprise integration for total optimization by excluding information system duplication in group
- IT infrastructure and information system architecture setting for the future

2) Existing assets reuse
- While using existing assets (mainframe, open systems), replaces systems by SOA based systems in renewal timing. Reduces after support / operation cost, by creating service interface gradually without risks.
- For integrating between internal and external systems, develops service interface for external system using existing systems.

3) Business process visualization / adaptation to change
- Adopts SOA as system platform to support Business Process Management.
- Adopts SOA for enhancing internal control / compliance, and visualizing business process.
- For system efficiency with various business process using common components.

4) Data integration / front integration
- Integrates distributed analogous data, and optimizes operations cost.
- Integrates masters with M&A / re-organization.
- Real time business management information or integration of business information (Portal, dashboard, enterprise mashup)

Breaks down into 4 major implementation patterns of exercising business / IT impact of SOA effectively, from SOA case study analysis.
Total optimization by resolving function duplication in same information system, creating shared service, system integration related to M&A and enterprise integration.

Enables to consider based on SOA as a future information system architecture.

**Without SOA**

- **Business A**: Individual App
  - App platform
  - Middleware
  - Administration

- **Business B**: Individual App
  - App platform
  - Middleware
  - Administration

- **Business C**: Individual App
  - App platform
  - Middleware
  - Administration

**With SOA**

- **Service for Business A**: Service for Business A
- **Service for Business B**: Service for Business B
- **Service for Business C**: Service for Business C
- **Common Management Service**: Common Management Service

**Service platform**

- Enterprise Service Bus / Portal
  + Application Server
- Administration

**Silo type business system**

- Separate App architecture/administration
- Duplicated logic among businesses

**SOA applied system**

- Integrated App architecture/administration
- Duplicated logic share/reuse
Existing assets reuse

While reusing existing assets including mainframe / open systems as a service, realizes portal integration of information from each system, or integration with new system.

Opens enterprise system / application with standard interface, and integrates with decision navigator and other systems.
Business process visualization / adaptation to change

Make views of “As-is” and “To-be” of business process, enables flexible change of business process by applying SOA to BPM, and improves process.

**action**
Formulates/execute business process improvement action.

**plan**
Business process analysis/simulation

**check**
Business process monitoring

- BPM+SOA base system
- Collaboration / portal platform
- Business process platform
- Service linkage platform
- Service integration platform
- Component
- Service

**Business process visualization / standardization**

**Efficient business operation**

**Improves customer service / lead time**

**For internal control / SOX and business process integration**

**Rapid support against new business**

**IT plan, target business selection**

**Uses common service and components**
Data integration / front integration

Promotes integrated usage of internal/external information, and aims to improve business/system efficiency, customer relations, and productivity of employees.

<Integration in presentation layer>  <Integration in application layer> <Integration in data layer>

1. Front integration
   - Portal server
     - Portal/mashup
   - App server
     - Service
   - DB server
     - DB

2. Service type data integration
   - Process server
     - System process
   - App server
     - Service
   - DB server
     - DB

3. Database integration (ETL type)
   - App server
     - Service
   - Integrated DB server
     - Integrated DB
   - Data process engine
   - App server
     - Service
   - DB server
     - DB

4. Database virtualization (EII type)
   - App server
     - Service
   - *EII server
     - Virtual DB
   - DB server
     - DB

As other methods, there are data integration for BI/DWH, data migration, master management, data synchronization, etc.

(*)EII=Enterprise Information Integration
Service integration

Supports system configuration that is adaptable to change with SOA.

▼ Highly reliable platform to rapidly and flexibly supports business / system integration, and to rapidly adapt to business environment change.

SOA system layer

Presentation layer
- User interface
- User interface
- User interface

Process layer

HUB products
- Service call / message transform

Service layer
- I/F
- I/F
- I/F
- I/F

Application layer
- Business logic
- Business logic
- Business logic
- DAO
- DAO
- DAO

Data store layer
- Database
- Database
- Database

Portal

Enterprise Service Bus

Application Server
2. WebOTX Enterprise Service Bus
What is Enterprise Service Bus (ESB)?

- Technology and middleware for application integration
- Integration method based on message exchange of SOA
- Standard communication protocols such as HTTP, SOAP, JMS
- Synchronous / asynchronous integration by message routing / transform
- Loose coupling without affecting integrated application
Conventional system/data integration

1. Direct integration between systems

2. Integration using queue/ DB/ file between systems

3. Integration using middle server

4. Integration mutually referring to each DB

Development/operation/support cost increases relative to integration number
Advantages of ESB implementation

Integration logic can be disconnected from business application system.
- Coding and resource becomes unnecessary for Point to Point connection.
- Enhances reusability of integration logic and maintenance.

Easily enables system connection/disconnection, and realizes flexible integration.

Absorbs difference of protocols among each systems.
Cost benefits of service bus

Initial cost for ESB implementation is required, but compared to conventional integration method, cost can be reduced within the short time as integration number increases.

1. Initial investment for service bus
2. Initial cost recovery by SI cost reduction
3. Accelerates cost reduction effect with further system change

Reduces middle-long term cost in system change
What is WebOTX Enterprise Service Bus (WebOTX ESB)?

- Highly performed system & data integration platform with high reliability and open system.
- Enables secure integration of any system and resource, from existing legacy assets to latest cloud service.
- Realizes complicated routing control and data transform without programming.
WebOTX ESB features

High performance
- “FTP direct forwarding function” & “forwarding rate setting function” preventing ESB performance degradation during integration using big amount of data.
- NEC unique technology “ultrafast speed XSL transform function”

High reliability
- Load balancing in multi-process configuration and high speed automatic recovery from failure.
- Load balancing by path control corresponding to load balancer
- Delivery guarantee and advanced recovery in abnormal condition by try & error notification.
- Priority setting function for stable operation of mission-critical system integration during high load.

Flexibility
- Real time data integration with Salesforce without coding
- Seamless integration with existing assets such as ACOS and TPBASE etc.

Operability
- Integrates multiple ESB easily. Operability is still same as single ESB.
- Integrates management of complicated authentication over several systems.
FTP direct forwarding & forwarding rate setting

Maintains ESB performance during integration by large volume data.

- FTP direct forwarding function
  ESB minimizes load to server by forwarding control command only.

- Forwarding rate setting function
  Enables to set up forwarding rate in ESB. This prevents running out of server resource for ESB all of a sudden, and realizes stable operation.

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  ESB minimizes load to server by forwarding control command only.

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  Enables to set up forwarding rate in ESB. This prevents running out of server resource for ESB all of a sudden, and realizes stable operation.

ESB operates ftp control command. (Data is not treated)

Avoids CPU occupation by enabling setting forwarding data quantity per second E.g. : 1 M byte / second

Not lots of data are used in memory during file forwarding.

High performance
High reliability
Flexibility
Operability
Productivity
Others

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Realizes XSL transform processing in high performance with NEC unique XML analysis technology.

- XSLT compliant serial process high speed transform engine based on mechanism with stream processing not generating XML tree structure.
- Enables high speed by deleting saved data required for serial transform processing.

### Input XML data

```
<Root>
    <A>
        <B>123</B>
        <B>456</B>
    </A>
    <C>ABC</C>
    <D>
        <E>GHI</E>
    </D>
</Root>
```

### Conventional

- Analyzes all data and generates Tree
- Generates XML data according to transform rule
- Transform rule (Addition, change, deletion, sorting, etc.)

### NEC unique technology

- Minimizes and preserves only data which is used on follow-on process. (patent pending)
- Abolishes Tree generation with high cost, and extracts required data with serial analysis.

### Output XML data

```
<Root>
    <L>
        <M>123</M>
    </L>
    <X>GHI</X>
    <Y>
        <Z>ABC</Z>
    </Y>
</Root>
```

### Performance measure result

![High speed XML transform result graph]

- WebOTX V8
- Other ESB

[Condition] CPU: Intel Xeon 1.5GHz Memory: 4GB OS: RedHat Enterprise Linux 4.0

Multi-process configuration

Runs ESB in multiple process. [WebOTX unique highly reliable platform]

- Detects failure of linked processing, and rapidly / automatically recovers.
- Shuts the process during failure recovery, but realizes non-disruptive operation by distributed action in other processes.

* This feature can be enabled with WebOTX AS Foundation or higher.
In stead of load balancer, load balancing of duplicated service can be enabled with ESB. *1

Flexible system operation enabled with dynamic addition / deletion of integrated system.

Shuts partly in case of failure. Delivers to other services and improves availability of whole system.

*1 Software load balance function
- Weighting round robin load balancing
- act-standby

Automatically detects error message, and failure path is shut by ESB

By dynamic path addition, during high load or system update in some server disruption, operation can be continued without performance degradation of whole system

“Slow start function” in case of path addition. This prevents unstable service such as no response caused by sharp increase of load.
Retry & error notification

- Error retry function is deployed for sending message in specified times in case of abnormality. This realizes assured message delivery.

- Error notification function is deployed for automatically calling processing in case that retry failed. Post-processing during abnormal condition can be separated from normal condition.
Priority setting

- Priority can be set up per integration target, and important message is routed preferentially.
- By setting up high priority on important job, this job can be processed in case of high load.

Important message is processed preferentially in case of high load

Sends in order of priority

Priority can be specified according to importance
Realizes seamless real time data integration between existing system and Salesforce.

- Same data can be shared between existing system and Salesforce in real time. Prevents data unconformity.
- Integration with Force.com can be realized without coding.
Realizes integration with system which adopts unique communication protocol.

Realizes high speed integration while eliminating processing time of high level protocol.
ACOS assets use

System / data integration of system / database / cloud service with ACOS / TPBASE existing assets and open technology.

- High performance
- High reliability
- Flexibility
- Operability
- Productivity
- Others
In distributed ESB environment, from designing through operation, message transfer between ESB can be treated as a single ESB.

*WebOTX AS Enterprise is required.*
Security

- Authenticaes access to ESB, and protects system and resource connecting to ESB.
- Diffusion, attachment, etc. of authentication information can be finely controlled in entrance / exit of ESB.
- Deploys authentication system inside ESB, and prevents invalid utilization of unexpected route and system.
- Supports xAuth which is authentication method between systems based on OAuth specification.

![Diagram of WebOTX ESB](image)
Message trace

- Deploys message trace function to record message passing ESB in files or databases.
- Effective for failure analysis, business analysis, and internal control, etc.
- If data are recorded in database, key search of message type, sender, receiver, time, etc. through communication record by using WebOTX Administrator(*) is enabled.

Message detailed information display

Specifications time, type, etc. and search message. Analyzes related message flow

Message search window (WebOTX Administrator)

(*)WebOTX Administrator is common administration GUI tool of WebOTX series
Routing setting [WebOTX Developer]

- Supports system / data integration setting by GUI tool
  - Deploys virtualized icon of system, resource, and cloud service, and writes setting and lines in setting window.

Message routing setting window (WebOTX Developer)

System connection information setting window (WebOTX Developer)
XML mapping [WebOTX Developer]

Supports XSL file creation with GUI tool

- Supports WSDL, XML Schema, DTD, and XML as data structure file.
- Provides test execution function for defining while confirming transform result.
- Provides dialog to describe logic for complicated data transform

Enables to directly call from connection definition editor of ESB

- WSDL file
- XSD file
- DTD file
- XML data file
Above files can be used as data structure

Enables to define while confirming by test execution function

Data mapping can be done by relating with Drag & Drop operation

Additional XPath Functions can enhance the feature.
## WebOTX ESB product information

<table>
<thead>
<tr>
<th>Product name</th>
<th>Product detail</th>
<th>Type</th>
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<tbody>
<tr>
<td>WebOTX Media V8.4</td>
<td>Installation media</td>
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<td>WebOTX Enterprise Service Bus V8.4</td>
<td>WebOTX ESB execution license</td>
<td>License</td>
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<td>WebOTX Enterprise Service Bus CU License V8.4</td>
<td>WebOTX ESB additional CU license</td>
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<td>WebOTX Developer V8.4</td>
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</tr>
<tr>
<td>WebOTX Administrator V8.4</td>
<td>WebOTX administration environment license</td>
<td>License</td>
</tr>
</tbody>
</table>

(*1) In virtual environment, number of license equal to virtual environment is required.

(*2) Please consult if CPU with more than 8 core in processor package is used.

(*3) WebOTX ESB includes equivalent of WebOTX AS Express. ESB can also be used with WebOTX AS Foundation/Standard/Enterprise.

<table>
<thead>
<tr>
<th>Physical CPU number</th>
<th>Multiple core (2~8 core)</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5~8</th>
<th>9~16</th>
<th>17~32</th>
<th>33~64</th>
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<td>3~4</td>
<td>5~6</td>
<td>7~8</td>
<td>9~16</td>
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<td>33~64</td>
<td>65 or more</td>
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<tr>
<td>Required CU license number</td>
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<td>0</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>6</td>
<td>8</td>
<td>16</td>
<td>32</td>
<td>Consult us</td>
</tr>
</tbody>
</table>

E.g.) In case installation is done to machine with 4 physical CPU (each one is quad core)

Multiple core CPU x 4, so required CU license is 6 from the table. The result is following.

- WebOTX Enterprise Service Bus × 1
- WebOTX Enterprise Service Bus CU License × 6
Thank You

Application Service Platform for the age of cloud-computing

For more product information & request for trial license, visit >> http://www.nec.com/weobotx/

For more information, feel free to contact us - global@soft.jp.nec.com