\Orchestrating a brighter world

NEC

Software-Defined Networking (SDN) Solution

NS Solutions Corporation (NSSOL)

NS Solutions

Challenges
- Needed to build the R&D environment without compromising the security of each project unit.
- Had no network managers and requires much time to set up new networks.
- Needed to recover all equipment once a project was completed to eliminate any potential security risks.

Solution
- NEC's UNIVERGE PF Series of SDN architecture which uses ProgrammableFlow, NEC's original technology based on standard OpenFlow.

Results
- Created suitable environments for R&D projects in one hour that took 5 days previously.
- Relaxed the rules surrounding internet usage in the R&D environment because individual VTN guarantee full security regardless of the access point.
- Optimized operations by pooling firewall appliances and reducing the number of devices required through logical allocation.

Introduction

NS Solutions Corporation (NSSOL) offers systems integration and cloud services to support IT activities across a range of industries.

NSSOL's superior technological prowess is fuelled by its Systems R&D Center which helps develop new solutions, and evaluates and verifies new products and new technologies.

"We anticipate how needs are likely to evolve over the next few years. This forward-looking approach is reflected in NSSOL's cutting-edge systems integration services for customers and our own internal systems too." said Isao Nakaguchi, Assistant Chief Researcher, Systems Research & Development Center, NSSOL.

Challenges

NSSOL's Systems R&D Center deals with a large amount of highly-confidential information when developing client systems and new solutions. But improving the convenience of new services without compromising the security of each project unit is a real challenge. NSSOL stakes its reputation on first ensuring full security, and then swiftly building a workable R&D environment. First, NSSOL creates an exclusive environment for a new project at the time of launch to minimize the possibility of information leaks, and then swiftly builds the optimum R&D environment for that particular project. However, it has run into problems recently trying to offer speedy, secure new services using its existing network technology.

"The R&D environments people need today are more complex than in the past, with projects often involving contributions from multiple teams and requiring links to external cloud services. Existing networks are often specific to individual floors or divisions, so establishing these broader environments were often difficult and time-consuming," explains Manabu Hagiwara, Senior Researcher at NSSOL.

The time required to set up new networks was always the biggest bottleneck. Preparing the necessary resources on the server could be done instantly using virtualization technology, but NSSOL then had to physically install new devices and wire new connections in order to make the necessary network additions and changes. Sometimes new network devices had to be ordered. In addition, the value of existing network virtualization technologies such as VLAN was considered limited, because it could be difficult to change settings on specific networks without impacting other existing network environments.

NSSOL's System R&D Center didn't have any dedicated network managers,

so researchers such as Hagiwara had to manage the networks. This was not ideal when needing to establish complex R&D environments swiftly.

"Researchers want to try out their new technologies and introduce ideas as soon as possible. We couldn't progress our research and development until we had built the right environment, so many people on the ground were pressing us to speed up that part of the process." explains researcher Yu Imagawa, Researcher at NSSOL.

Finally, rather than abandoning the R&D environment once a project was completed, NSSOL needed to recover all equipment at the end of each project to help boost utilization rates and eliminate any potential security risks.

Solution

NSSOL's Systems R&D Center focused on software-defined networking (SDN) as a potential solution. The company believed virtualizing networks using SDN was the answer to many of its recent challenges. NSSOL finally chose NEC's UNIVERGE PF Series of SDN architecture which uses ProgrammableFlow, NEC's original technology based on standard OpenFlow. Under this new architecture, all projects share the same physical network. Multiple individual virtualized networks, or Virtual Tenant Networks (VTN), are established so that each project operates on its own exclusive virtual network. This eliminates the need to install new equipment and connections for each network, and enables researchers to operate their own networks freely and flexibly, with very few physical restrictions.

"We needed a system that would allow us to virtualize networks swiftly and flexibly while maintaining the same level of security. We needed a multi-vendor compatible system for our development and evaluation in order to make assumptions about various different environments. We considered multiple different options and technologies, but NEC was the only contender at the time who could fulfil all of our requirements on a practical level," explains Nakaguchi. According to Hagiwara, another reason why NSSOL chose NEC was because it had disclosed its application programming interface (API). "By developing and linking various programs using a disclosed API, we can boost operational efficiency, and then develop even more advanced applications."

The simplicity of NEC's SDN system was also a huge plus.

"The management console is based on a graphical user interface (GUI), so we can control the entire network from a central location and see the virtual network structure and data flow on a visual display. You can conduct functional and operational checks efficiently. We knew we would be able to reap the full benefits of the system quickly and easily," explains Imagawa.

Results

With SDN, NSSOL's Systems R&D Center can now establish the virtual networks, whenever it wants. The company has also used the UNIVERGE PF Series API to build its own self-service portal which automates the creation of suitable environments for R&D projects. Network managers and researchers are both able to provision the servers and networks.

"We are currently conducting tests with a view to full operation. We have not encountered any significant problems and everything is operating smoothly. Previously it took up to five working days to process an order for a suitable R&D environment, but, with SDN, we can do it in approximately one hour. That's a huge saving," states Imagawa.

NSSOL is also able to relax the rules surrounding internet usage in the R&D environment because individual VTN guarantee full security regardless of the access point.

"We can now operate each environment securely and flexibly because we know all internet connections will only pass through the specified VTN. That means we can use external public clouds, and conduct projects smoothly with external divisions. Flexibility and security, those have to be the two most prominent benefits of SDN," insists Hagiwara.
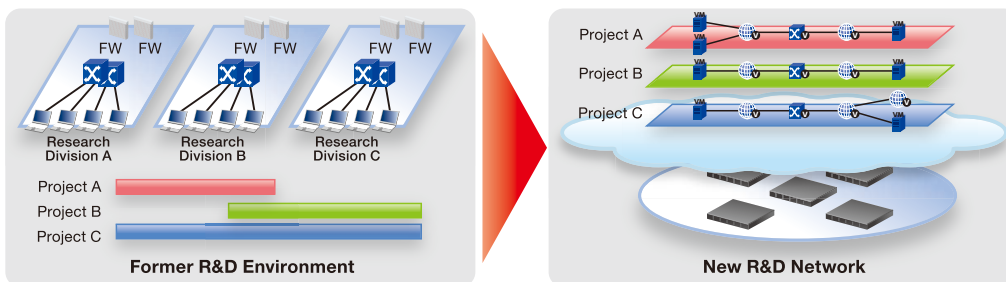
NSSOL enjoys SDN's ability to optimize operations by pooling firewall appliances and reducing the number of devices required through logical allocation. NSSOL is already thinking about new potential applications and solutions.

"We are discussing new possibilities with NEC. For instance, if we could ascertain detailed information on network resource usages patterns, we could use that information to boost effective resource utilization. Also, if we could analyze internet usages trends, we could optimize security management and sizing to suit the nature and scale of each individual project," explains Imagawa.

NSSOL plans to actively expand its SDN applications, channeling its analysis and the practical knowledge gained from operating R&D environments into developing new internal systems, and possibly some new solutions for customers.

"SDN offers efficient, optimal network configuration, so its widespread introduction is almost inevitable. NSSOL could significantly strengthen its competitiveness by operating SDN-based R&D environments, and applying this experience to improving existing services and developing new solutions," says Nakaguchi.

NSSOL has already successfully optimized its R&D environment networks, arguably the most important competitive factor for a systems integrator. NSSOL is now considering ways to employ SDN architecture to further refine its technological prowess, and actively pursue new avenues of value creation.

Former R&D Environment

Firewalls established for each research division.
Recent projects involved several research divisions.
Establishing/amending R&D environments was more complex.

New R&D Network

All projects share the same physical network.
Project-specific networks can be established/changed/deleted logically and flexibly.