

ZTV Co., Ltd.

## Modernizing the Core Network Supporting Carrier Business with the Integration of IP and Optical Transmission for Advanced Traffic Control

ZTV, which operates cable TV and network businesses mainly in Mie Prefecture, modernized its core network by adopting Cisco's RON (Routed Optical Networking) architecture. By adopting a multi-vendor configuration that leverages existing optical line systems and simplifying the configuration, ZTV achieved reductions in operational management workload, space-saving, and a 60-70% reduction in power consumption. Additionally, Segment Routing has enhanced fault tolerance.



### ZTV Co., Ltd.

**Location**

4-7-1 Anotsudai, Tsu City, Mie Prefecture

**Established**

October 1, 1990

**Capital**

1,070.4 million yen

ZTV, which operates cable TV, as well as internet, mobile, and fixed-line phone businesses in the service areas of Mie, Shiga, Kyoto, and Wakayama Prefectures, has been a familiar presence since its cable TV business, the company's primary operation, opened in 1994 and currently serves about 300,000 households.

### Challenges

- Revamping the core network. Considering a next-generation network to solve existing issues.
- Wanting to integrate IP and optical transmission networks while maximizing the use of existing equipment.
- Desiring to utilize the multipath prepared for fault occurrences effectively.

### Solutions

- Cisco RON architecture

### Results

- Simplified network configuration and reduced operational management workload, installation space, and power consumption by integrating IP and optical transmission.
- Achieved advanced traffic control through Segment Routing, utilizing multipath for rerouting and fault tolerance.
- Realized the integration of IP and optical transmission while leveraging existing assets in the optical line system.

### The Future

- To Address Increasing Traffic: Contributing to the expansion of 5G

"Cisco understood the evolution we are aiming for and provided proposals that exceeded our expectations."

### Mr. Takayasu Nakayama

Executive Managing Director, Communication  
Operations Division  
ZTV Co., Ltd.

## Challenges

### Starting considerations to realize high performance and reliability

ZTV is not only delivering services to individuals but also to businesses. These include network businesses like optical line services, internet services, and wide-area Ethernet services, as well as selling TV commercial slots. The wide-area Ethernet service, which allows for easy construction of secure WANs between locations, is widely used by municipalities and companies in areas where ZTV has laid optical cables.

This wide-area Ethernet service is supported by the company's core network.

Originating in Mie Prefecture, it extends north to Fukui Prefecture, east to Gifu and Aichi Prefectures, south to Wakayama Prefecture, and west to Kyoto and Osaka Prefectures. This extensive network is known as the ZTV core network.

"The core network not only supports customers' businesses through wide-area Ethernet but is also used as a relay network for mobile carriers, requiring high performance and reliability. We have been actively implementing new technologies and gradually enhancing them," says Mr. Takayasu Nakayama of ZTV.

For instance, the initial core network adopted a ring structure, with devices connected circularly. However, due to issues such as the inability to select the shortest path and inefficient bandwidth utilization, the next network was revised to a multipath configuration. In response to redundant transmission lines experiencing simultaneous troubles due to a natural disaster, measures have been taken to build transmission lines with two or more paths to allow for rerouting.

Thus, the core network has been gradually strengthened, but with some of the physical equipment reaching End of Life, it was time for an overhaul. The company began considering the construction of the next core network.

## Compatibility with Multi-Vendor Configuration for IP and Optical Transmission Integration

### Solutions

#### Introducing Technology Adopted by Major Carriers at a Reasonable Cost

The company solicited proposals from multiple vendors to construct the next core network.

After comparing them, the company ultimately adopted Cisco's proposal.

There were two main points of evaluation: "Segment Routing" and "RON (Routed Optical Networking) Architecture." "Cisco provided proposals that exceeded our expectations when we demanded further enhancement of performance and reliability," says Mr. Nakayama. Mr. Takashi Shimizu of the company also adds, "Both Segment Routing and RON architecture are the technologies major carriers have increasingly implemented in recent years. If we could do it at a reasonable cost, we definitely wanted to implement them."

Segment Routing controls communication by adding state information to packet headers. When a particular route is congested or in the event of a failure, it quickly reroutes traffic to the optimal path based on metrics like route designation, communication bandwidth, and communication delay, thereby achieving traffic engineering that optimizes network resource utilization, reduces delay, and improves throughput.

"We can make even better use of the multipath established in the previous network. We thought it was a very rational evolution," says Mr. Nakayama.

The other, RON architecture, is a network architecture that integrates the IP layer and the optical transmission layer. Cisco has advocated this concept for some time and has been quick to offer solutions.

Specifically, many carrier networks are composed of routers, transponders, wavelength division multiplexing (WDM), ROADM, optical amplifiers, and other optical transmission devices. However, Cisco's RON architecture changes the transponders to pluggable coherent optics (DCO) and integrates them into the router. This simplifies the configuration of network devices, reducing operational management burdens. It also realizes an optimal network for advanced control and operational automation, such as Segment Routing.

"Reducing the number of devices certainly reduces operational management burdens and the risk of failures. Moreover, in Cisco's RON architecture, the coherent optics (DCO) that handle the mutual conversion and relay transmission of electrical and optical signals instead of transponders can expand the WDM wavelength signal bandwidth from 100Gbps to 200Gbps just by purchasing a license without having to replace or add equipment.

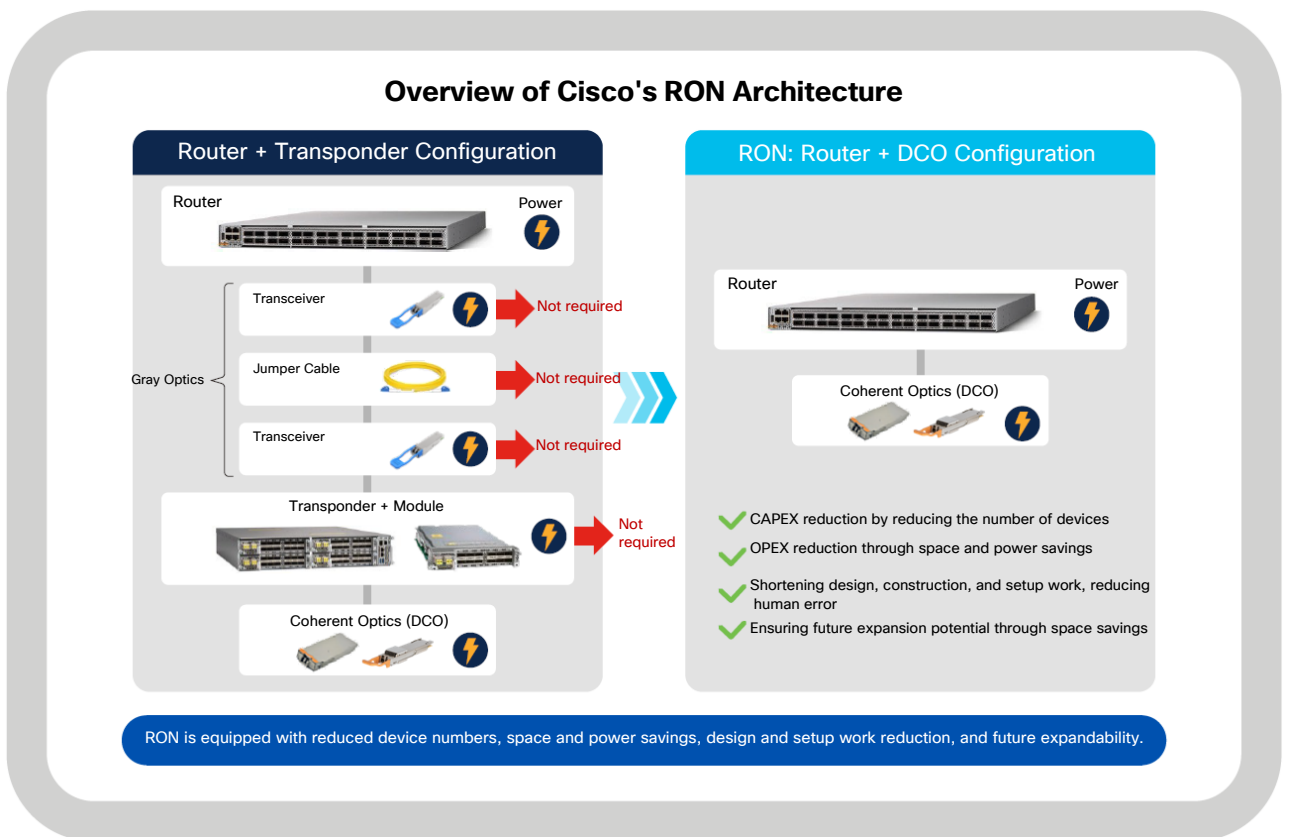
The ability to immediately scale up the network as needed, without worrying about router slots, rack space, or replacement work, was desirable," says Mr. Shimizu.

## Results and the Future

### Reduction in Power Consumption by 60-70% through Equipment Reduction

The new core network built with Cisco is already operational. Cisco's partner, Mitsui Knowledge Industry (MKI), handled the construction support. Utilizing Cisco's carrier-grade router NCS-55A2-MOD and adopting the RON architecture has contributed to reducing operational management workload and costs as initially expected.

"Reducing the installation space has saved on housing costs, but the most significant impact is on electricity costs. We have reduced power consumption by about 60-70% compared to the previous network," says Mr. Shimizu.



The high evaluation also comes from the fact that the RON architecture was introduced while effectively utilizing existing assets.

As mentioned earlier, the new core network adopts Cisco's NCS-55A2-MOD for routers, integrating transponder functions into it, but the optical line system uses equipment from Adtran Networks that was previously used. In other words, the RON architecture was realized in a multi-vendor configuration utilizing existing assets.

"The standards are the same, so theoretically, it should work. We wanted to continue using still usable equipment and curb investment. However, since we are combining equipment from different vendors, we wanted to proceed carefully. Cisco quickly provided verification machines and technical information. At the same time, Adtran Networks also cooperated with the detailed design of the OLS (Optical Line System), considering the characteristics of filters and amplifiers, examining reachability, and adjusting the injection level to the line. Using verification machines and design information, we were able to recreate and verify conditions close to the actual environment. Through this verification, we thoroughly confirmed that there were no issues and confidently decided to implement it," says Mr. Shimizu.

The new core network, which adopts the RON architecture in a multi-vendor configuration, has been operating steadily without significant troubles so far. "We are very grateful for Cisco and Adtran Networks' flexible response. Currently, it's only the core network, but we hope to eventually expand the RON architecture to the access network as well," says Mr. Nakayama.

With the renewal and bandwidth enhancement, the core network, which now can stably exhibit high performance through the RON architecture and segment routing, holds various possibilities.

"For example, with the spread of e-sports, the demand for higher communication and lower latency will grow. We believe that we have realized a core network that can fully meet such demands of the era," says Mr. Shimizu.

Mr. Nakayama adds, "With Segment Routing, it is also possible to logically divide the network by slicing according to the application. By dynamically selecting the optimal slice based on metrics like communication bandwidth and delay, we can respond to diverse requirements. We want to use the new core network for various applications. Connecting 5G network base stations to the edge and contributing to the expansion of 5G network services is also one of the various measures we are considering," outlining his vision.

How will ZTV, which has strengthened its core network with the latest technology, propose new value to customers— The company's future business is something to look forward to.



**Mr. Takayasu Nakayama**

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ZTV operates cable TV, as well as internet, mobile, and fixed-line phone businesses in the service areas of Mie, Shiga, Kyoto, and Wakayama Prefectures. The core network not only serves as the foundation for the wide-area Ethernet service but also as a relay network for mobile carriers, contributing to the realization of a stable communication environment in the service area.

URL <https://www.ztv.co.jp/>

## Products and services

- Carrier-grade Router:  
NCS-55A2-MOD-SYS
- Coherent Optics (DCO):  
CFP2-WDM-DS-1HL=