Outsourcing Provider Transforms Business Model

Italian ICT company TSF adopts Cisco Data Center 3.0 vision to create new, on-demand cloud services.

EXECUTIVE SUMMARY

Customer Name: Tele Sistemi Ferroviari

Industry: Technology

Location: Rome, Italy

Company size: 700 employees

Challenge

- Desire to change business model in order to win new customers

Solution

- Cisco Data Center 3.0 vision, architectures, and technologies

Results

- Revenues from new IaaS services alone to reach 2-3 percent of total revenues in first year
- Huge CapEx and OpEx savings from agile, simplified infrastructure
- Cost reductions include: cabling costs 70 percent, new server provisioning 25 percent, power consumption 60 percent
- TSF is strongly placed to become a leader in the cloud computing services market

Challenge

Tele Sistemi Ferroviari (TSF) is one of the leading providers of ICT services to the transport and logistics industries in Italy. It was set up as a spin-off from the ICT division of the Italian State Railways Group which remains TSF's biggest customer.

TSF's goal was to build on a period of strong business growth, while reducing its dependency on one revenue source in order to minimize risk. The company aimed to win new business from existing customers and reach new customers in different industries. TSF also wanted to ensure that it was ready to take advantage of the economic upturn, when it arrived.

"We believed that the time was right to change from a hosted service delivery model to pay-per-use," says Francesco Barbieri, Manager of Data Center Operations at TSF. "This would enable us to create an extremely agile infrastructure, lower our CapEx and OpEx, and sell new services at competitive prices to customers in a broader range of industries."

To achieve all this, the company would have to adopt a new business model and transform its IT infrastructure from a cost center into a revenue generator. Being able to respond to customers' needs more quickly and cost effectively was an urgent priority. Previously, TSF would buy new, dedicated hardware for each project, an approach that was no longer flexible enough; for example, it took about a week to provision a new service.

Using this traditional model, TSF had built up five separate data centers, each dedicated to a customer portfolio or a major application such as railway ticketing. The silos operated independently of each other, needed large amounts of space, consumed huge quantities of power, and were costly and time-consuming to manage.

Because there was minimal connectivity between the data centers, demand for extra capacity in one location could not be met by under-utilized capacity in another. As a result, TSF would continue buying more devices until a data center was full and then open a new facility, which increased complexity and costs. Functions such as management and support were duplicated, which required higher staffing levels and put extra pressure on computing and storage resources, raising costs still further.

TSF envisaged a virtualized data center where resources could be allocated to projects from a consolidated 'pool' in a flexible and scalable manner. This would enable the company to offer customers more competitive pricing, faster deployment, and new service options.

Solution

TSF decided that it could best achieve its goals by using Cisco Data Center 3.0™ architectures and technologies. Cisco Data Center 3.0 provides a roadmap for transforming infrastructure through the data center in three key phases: consolidation, virtualization, and automation. TSF had already embraced Cisco's data center vision three years before, when it embarked on an extensive process of server consolidation followed by an equally large project to unify and consolidate its storage, using a Cisco storage area network (SAN) solution.

When TSF was ready to create a fully virtualized data center, it developed a model based on a large, powerful core linked to smaller pods (pools of devices). TSF's design was based on the ability to unify storage, computing, and networking capabilities within these pods and provide an integrated, consistent interface—abilities that are inherent to Cisco Data Center 3.0. "When Cisco presented Data Center 3.0, we realized this was the right technology at the right moment for us," says Barbieri.

TSF decided to base the architecture of its new network, from the core to the access layer, on the Cisco Nexus family of data center solutions, including Cisco Nexus 7010 switches, Cisco Nexus 5000 switches with Fiber Channel over Ethernet (FCoE), the Cisco Nexus 2000 Series Fabric Extenders, and Cisco Nexus 1000V virtual switches with VMware vSphere integration. In the network core, Cisco Nexus 7010 ultra-fast switches and Cisco MDS 9000 SAN switches provide 10 Gigabit Ethernet and 8 Gigabit fiber channel connectivity to the access layer.

The access layer is made up of standard, replicable pods, which are only three racks wide and can be located in every room inside the data center. TSF built three types of pod to support existing and new applications:

- Pods that include Cisco Nexus 5000 switches for connectivity and rack-mountable servers for computing resources based on either x86 or RISC architectures.
- A Unix pod with unified I/O, which is currently being tested and demonstrates the importance of being able to extend data center networking beyond the x86 architecture to encompass all aspects of connectivity.
- Pods based on the Cisco Unified Computing System™, with UCS 6120 Fabric Interconnects for connectivity and the UCS 5100 Series Blade Server chassis and B2000 blades for computing resources. This type of pod includes the VMware vSphere virtualization platform which, together with the Cisco Nexus 1000V, gives the network virtual machine-awareness.

In fact, each type of pod makes extensive use of unified fabric technologies, which greatly reduce the number of adapters and cables needed for intra-rack and inter-pod connectivity.

A dedicated service layer connected to the collapsed core-distribution layer provides advanced network services such as load balancing and firewalls. The network core also acts as the bridge between the new data center and the legacy data center, enabling TSF to migrate existing services from the old infrastructure to the new one simply by powering on the existing virtual machines in the new vSphere-over-UCS environment.

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> **–Marco Barbalinardo, Manager of Network and Telecoms, TSF**

The Cisco team worked closely with TSF to help the company develop its data center vision and architecture, and then deploy the solutions that would realize the vision. There were several meetings between the two partners and discussions with Cisco technology specialists, including a visit to the Cisco headquarters in San Jose to talk to some of the engineers who developed Data Center 3.0.

"The way that we interacted with Cisco to get this project off the ground was not the kind of help you can buy at a list price," says Marco Barbalinardo, Manager of Network and Telecoms at TSF. "Cisco listened to our ideas and needs, then helped us develop our ideas and translate them into something concrete. They did a wonderful job."

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>
> **–Alberto Giaccone, Data Center Network Operations Manager, TSF**

The Cisco Services organization became involved at the deployment phase, providing assistance with some design elements, verification, and training and knowledge transfer through its Advanced Services portfolio.

Cisco Services then validated the entire project and helped TSF to create a scaling model for the Cisco Unified Computing System (UCS). They also implemented UCS in the new data center and supported TSF throughout the deployment. "Without Cisco Services, we would not have been able to deploy the new solutions so quickly and with so little risk," says Alberto Giaccone, Data Center Network Operations Manager at TSF.

Results

Building a completely different type of data center has enabled TSF to achieve its objective of changing its business model. The company has developed a brand new portfolio, based on selling Infrastructure as a Service (IaaS), which includes services such as Internet connectivity, storage, archiving and back-up, and virtual computing power. TSF has identified a strong demand in the enterprise and medium-sized business markets and expects revenues from the new services to reach 2-3 percent of total revenues and 20-28 percent of current revenues from infrastructure services.

TSF has structured its pay-per-use model for maximum simplicity, convenience, and flexibility. It gives customers several different options on pricing, configuration, and capacity; for example, there are six tiers of storage services graded by cost and performance. TSF does not charge set-up costs; instead each service is built around a monthly fee, and customers pay nothing further as soon as their service is terminated.

Combined with real-time provisioning, this transparent cost structure makes the service model very attractive to customers whose requirements are short-term, unscheduled, or difficult to predict, and to any companies that do not wish to purchase equipment for whatever reason.

TSF benefits from the new model as much as its customers. Having invested in a scalable and agile architecture, the company is now in a position to grow its business at minimal extra costs. This is partly because TSF no longer needs to purchase dedicated new equipment for each new customer or project; instead, it can allocate existing resources as needed.

In addition to reducing CapEx in the long-term, TSF has significantly lowered its OpEx from day one. Higher server density means that the new facility uses one-tenth of the space required by TSF's legacy data centers. Previously, for example, one pod could only have contained 38 servers, but thanks to the power and versatility of the Cisco Unified Computing System a pod can now contain the equivalent of 144 servers. As a result of such improvements, TSF has reduced its power consumption by about 60 percent, which not only cuts fuel bills but also creates an environment that is more environmentally sustainable.

Unified fabric in the pods has enabled TSF to reduce its cabling requirements from eight cables on a single server, to two cables for every eight servers. Cabling costs alone have dropped by about 70 percent in the new data center, a significant figure because they used to represent up to 30 percent of each new deployment. The total cost for provisioning a new server has fallen by about 25 percent, which reflects the new-found simplicity of the task. It now takes a day or less to provision a new service, compared with a week to mount and cable a new server in the legacy data centers. As a result, staff are more productive and become available to support additional customers and services as the business develops.

"We now have an architecture that fits with our business and allows us to grow in a linear way, taking on new customers at a marginal cost and offering new services at very competitive prices," says Barbalinardo.

"There is a huge market for cloud computing services from companies that do not want to manage their own IT infrastructures. We are one of the first companies in Italy to address this type of market, using an extremely scalable and agile infrastructure that adapts easily and quickly to the needs of many customers."

–Francesco Barbieri, Manager of Data Center Operations, TSF

Next Steps

TSF will continue to develop its business and its infrastructure in parallel, starting with a massive project to virtualize 70-75 percent of the company's servers. The company has developed a model for optimizing this process by determining the virtual server that best matches each physical server in the legacy data centers. TSF also plans to address automation, the next logical stage of the process, first in its data center operations to help manage 3000 servers and then, when the volume of new services reaches an agreed level, to offer customers automated, self-service provisioning of non-custom services.

At the same time, TSF is moving further into cloud computing by developing a Platform as a Service (PaaS) offering based on access to a shared database cluster. Customers will pay a monthly fee for their 'segment' of the cluster, thereby reducing their expenditure on software licences, which currently accounts for 50 percent of many companies' IT software budgets. TSF is likely to take a similar approach with middleware, developing services targeted at several industries as part of its PaaS portfolio. In the field of Software as a Service (SaaS), however, TSF will probably focus on applications for transport and logistics, its core area of expertise.

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Technology Blueprint

Cisco Data Center 3.0 consists of an architecture and technology roadmap that are designed to help companies transform their data centers to a virtualized model, in order to achieve the agility, performance, and cost-efficiency needed by the business.

An important element of the Data Center 3.0 technology portfolio is the Cisco Unified Computing System (UCS) which integrates a 10 Gigabit Ethernet unified network fabric with x86-archtecture servers, providing an integrated, scalable, multichassis platform that operates, and is managed, as a cohesive system. This design closely resembles TSF's own vision for its new data center, in which a series of pods (pools of devices) provide huge amounts of computing power in compact units that also include a consistent interface to SANs (via Fibre Channel over Ethernet) and to the backbone.

"Cisco's vision of the data center is very close to our vision," says Barbieri. "I would describe the Unified Computing System as a 'thinking network' that lets you create one environment in your data center. The technology in UCS is complex and you have to take the time to understand it but, once you've done that, you have a much faster and simpler operation."

TSF is benefiting from many capabilities of UCS, such as its stateless design whereby system parameters are stored independently as software files that are simply moved to the appropriate location when a particular resource is needed. TSF has created several such files, or templates, representing many of the situations that occur in its data center. This approach helps to automate operations, and also strengthens the resilience of the infrastructure by enabling TSF to provide a new server within a few minutes, in the event of a failure, compared with 4-5 hours previously. As a result, TSF can guarantee to comply with very stringent SLAs without incurring the cost of deploying additional hardware for redundancy.

The Cisco Unified Computing System has also enabled TSF to fully optimize its server virtualization model. The two variables that influence how much a server's capacity is maximized during virtualization are computing power and RAM. Because computing power is more expensive than memory, TSF's model is based on saturating the computing power before the memory, using a saturation point of 92 Gbytes. At first this seemed unachievable because TSF's original virtualization model was based on 64 Gbytes, the maximum amount of memory in its legacy servers. Because each UCS server blade has a RAM capacity of 96 Gbytes, however, TSF will now be able to ensure that it utilizes all its computing resources during the virtualization process, thereby getting the maximum value from these assets.

TSF is deploying its new services in the new data center, while it continues to host about 400 applications in its legacy data centers. The company is sharing information between the two environments, which are also managed by the same solution, but it has no plans to migrate any of the legacy applications to the new platform. TSF has equipped the Cisco Catalyst 6500 switches in its legacy data centers with the Cisco Application Control Engine from its Data Center 3.0 portfolio, a virtualized load-balancing and application-delivery solution that increases the availability and performance of essential applications.

For More Information

Please visit:

http://www.cisco.com/go/datacenter

http://www.cisco.com/go/unifiedfabric

http://www.cisco.com/go/unifiedcomputing

http://www.cisco.com/go/nexus

http://www.cisco.com/go/whymds

PRODUCT LIST

The TSF data center architecture is based on the following products:

Collapsed core and distribution layer

- Cisco Nexus 7010 switches

Service layer

- Cisco Catalyst 6509 switches with 10 Gigabit Ethernet connectivity, Cisco Application Control Engine (ACE), and firewalls

Extension layer

- Cisco Catalyst 6509 switches with 10 Gigabit Ethernet connectivity

Storage core layer

- Cisco MDS 9000 Series switches for Storage Networking

Rack-mount server pod

- Cisco Nexus 5000 switches with FCoE and Cisco Nexus 2000 Series Fabric Extenders

Unified Computing pod

- Cisco Unified Computing System with UCS B-Series Blade Servers and Cisco Nexus 1000V virtual switches

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