

Platform ISF

Toward the private
cloud at CERN



Customer

CERN

Industry

Government Research

Challenges

- To improve server utilization in order to reduce the time it takes to get results from trillions of computing events
- To reduce the cost of managing heterogeneous virtual and physical machines running multiple hypervisors and operating systems that are necessary to meet user requirements
- To enable self-service administrative tasks for users to experience faster system responsiveness

Solution

Platform ISF and Platform ISF Adaptive Cluster

Benefits

Platform Computing's cloud management solution:

- Integrates with CERN's existing grid and hardware resources to scale server capacity and improve server availability
- Delivers opportunity to eliminate 150 of 200 servers in a cluster dedicated to Large Hadron Collider experiments
- Provides a self-service capability to allow scientists to directly choose their application environments and manage their processing workloads, increasing user efficiency and reducing IT management costs
- Creates one of the most powerful worldwide HPC facilities for CERN to run more experiments and to attract the best and brightest research minds

Large Hadron Collider experiments reach for the cloud

CERN (European Organization for Nuclear Research) depends on computing power to ensure that 17,000+ scientists and researchers in 270 research centers in 48 countries can collaborate on a global scale to solve the mysteries of matter and the universe. To accelerate their research CERN requires a cost-effective shared computing infrastructure that can support any server hardware with virtual machine hypervisors and operating systems.

When CERN started building a new cluster for the Large Hadron Collider (LHC), the plan was to use Platform LSF to manage the workload. "I've been responsible for our use of Platform LSF since 1997 and always thought that Platform LSF was the one part of our facility that we would not need to change for LHC," says Dr. Tony Cass, Leader Group, Fabric Infrastructure, CERN. "When the question of adding cloud capabilities arose, Platform ISF, from the same maker as Platform LSF, looked like a natural fit."

Platform ISF offers a private cloud computing infrastructure for CERN's network of scientists to efficiently manage application workloads for multiple virtual and physical platforms. Platform ISF unites the diverse platforms into a single dynamically shared infrastructure, to dramatically improve utilization with fewer resources. In addition, scientists can choose their own application environments and control projects dynamically to ensure that they recognize the full power of a private cloud; all at lower cost.

"Platform ISF and Platform ISF Adaptive Cluster will provide our users the scalability and flexibility they need to manage their clusters and share data center resources while adhering to our requirements for open standards"

Dr. Tony Cass,
Group Leader, Fabric Infrastructure,
CERN



The LHC project presented Cass' team with some new challenges. Most of the applications are highly specialized requiring a very high level of persistency that puts a heavy demand on the cluster. As a result, the overall utilization of the new 200-machine cluster supporting the LHC project was only about 10%. The first step to improve utilization was to

virtualize the machines. The new virtualized cluster supports multiple hypervisors including HyperV and Xen. This allows the experiment teams greater flexibility to use the best platform for their application. However, managing multiple virtualization technologies adds a level of complexity to the entire environment, so Cass and his team decided to look for a single management solution, Platform ISF, as the tool to manage both virtual and physical environments.

Platform ISF gives Cass and his team more control over the environment and with simple administrative efficiency by automating many tasks that hypervisors alone cannot automate. Platform ISF forms the core of their solution. Platform ISF manages the resources and application environment offerings, and provides a contract interface to enable users to reserve and use resources on demand.

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Dr. Tony Cass,
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CERN

Platform ISF provides flexibility in heterogeneous environment

"Platform ISF can integrate with all our resources, so we saw it as a useful addition to manage all of these hypervisors," says Cass. "The independence that Platform ISF offers is interesting to us in itself since our academic environment highly values tools that can interoperate with new developments rather than locking us in to the past."

Platform ISF is deployed on a cluster that supports the LHC, while Platform ISF Adaptive Cluster has is deployed with the batch workload HPC clusters - which consist of 3,800 multi-core machines. This allows CERN to create a private cloud environment to share resources between the different clusters as necessary.

"Platform ISF Adaptive Cluster is combined with the existing Platform LSF grid workload management solution. Together with Platform ISF, they will provide our users and research centers the scalability and flexibility they need to manage clusters with share data center resources while adhering to our requirements for open standards," says Cass.

Reducing cluster sprawl

Another benefit is the reduction of dedicated LHC cluster servers. "If we can move 150 machines [from a total of 200] out of this environment by improving utilization, we can either save some significant power and cooling costs, or we can redeploy the machines to the batch cluster without increasing the hardware budget," he says.

Cass also plans to provide direct self-service access to the cluster directly by the experiment teams. "If we can have Platform ISF automatically instantiate machines to meet the workload requested from experiment teams, this will reduce our administrative load. Historically, the value of Platform LSF has always been its capability to reduce the effort to manage a routine workload on static resources. Now, Platform ISF allows us to manage our combined virtual and physical environment more efficiently, by redirecting resources from time-consuming manual administrative tasks, with dynamic resources." Cass predicts that by using Platform ISF they will significantly reduce the effort required to reconfigure the batch configuration to meet a varying workload.

Platform Computing is the leader in cluster, grid and cloud management software - serving more than 2,000 of the world's most demanding organizations for over 18 years. Our workload and resource management solutions deliver IT responsiveness and lower costs for enterprise and HPC applications. Platform has strategic relationships with Cray, Dell™, HP, IBM®, Intel®, Microsoft®, Red Hat®, and SAS®. Visit www.platform.com.

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