The introduction of these new technologies in the production system has been gradual and fully transparent, and will continue during 2012, to be sources integrated in ConfDB, this provides a clear structure and a well identified information flow.

We are introducing in the ATLAS Online Farm currently in a testing phase, is described in a separate poster.

An overall upgrade of the monitoring system, based on Icinga and Nagios is being upgraded, to take advantage of more modern tools now available.

Virtualization

Virtual Machines have been introduced for special purpose services, not for computing or data flow:
- • low-load but critical services, e.g Quattor, Puppet, TDAQ OOKSVS
- • complement existing systems and increase redundancy e.g. Nagios for core monitoring
- • misc test/validation servers, web development servers
- • VMs increase the overall system flexibility, allow easier testing and better user of HW resources.
- • new management tools allow us to handle effectively the many special purpose configurations. Standardizing on KVM hypervisor on SLC6 physical hosts

Conclusions

We are introducing in the ATLAS Online Farm new strategies for configuration management and monitoring. They are performing very well and are providing the expected improvement in maintainability, extending the coverage and flexibility. In addition, they give better control of the system, and deeper insight into its status.

A node with locally installed OS receives configuration information from various sources (blue arrows): the Puppet server uses node status information (red arrows) to compile the profile. Its OS installation and updates are provided directly by the repository (black arrow). Monitoring information is collected by Nagios server (usually the boot LFS), some hosts also send more detailed performance information to the dedicated Ganglia server (red arrows).

Netbooted Nodes

- ~2350 nodes boot the Scientific Linux CERN S OS via PXE
- ~70 Local File Server (LFS) hosts provide DHCP, PXE, TFTP for booting, /usr read-only directory via NFS.
- Configuration of DHCP, PXE and boot parameters provided by ConfdB, our CMS for NetBoot nodes which is described in a separate poster.

Boots With Me tool
- Generates PXE boot images (kernel + RAMdisk root) and /usr
- Uses a reference SLC5 VM image as source

BWM postboot script system
- Hierarchy of shell scripts, configures services, disk and NFS mounts etc
- Uses the standardised hostname to decide which sequence of scripts
- Stored on central Network-Attached Storage, executed by the client

BWM puppet
- Start to introduce Puppet profiles to replace BWM scripts
- Improve consistency and maintainability
- Serverless configuration, for scalability, using the NAS as storage

A Subversion repository is used to track changes of the BWM image creation configuration, of the postboot scripts and Puppet profiles.

Monitoring system - alerting and performance

Existing system based on Nagios 2.5
- Scalability: each LFS runs an independent Nagios server instance with a limited number of clients
- Configuration of each Nagios instance generated by ConfdB
- Overall view generated by a web GUI developed inhouse, displaying data from Nagios and ConfdB
- Detailed monitoring of hardware health status via RPM
- Good coverage of alerting for critical OS issues

Ganglia, introduced in 2011
- Detailed performance monitoring, excellent and easy scalability
- Flexible Web interface with advanced visualisation functionality
- Used for ~300 special purpose nodes
- Per-host configuration is client-side only, managed by Puppet.
- Limited alerting functionality in latest GangliaWeb versions, not sufficient for us
- Testing integration with Nagios/Ganglia, the functionality is promising but reliability and scalability need to be proven

An overall upgrade of the monitoring system, based on Iaas and currently in a testing phase, is described in a separate poster.

Local Boot nodes

- Provisioning by PXE + KickStart
- DHCP+PXEl provided by an LFS, from ConfdB info
- Kickstart files generated by template-based system

Quattor
- CERN standard Configuration Management Tool
- Production system, managing 237 hosts in the Online Farm
- Tight control on installed packages
- Lack of flexibility for complex configuration/service dependencies
- Multiple languages for implementing modules
- CERN standard Configuration Management Tool
- Production system, managing 237 hosts in the Online Farm
- Tight control on installed packages
- Lack of flexibility for complex configuration/service dependencies
- Multiple languages for implementing modules
- Widespread industry adoption, active development
- CERN standard Configuration Management Tool
- Production system, managing 237 hosts in the Online Farm
- Tight control on installed packages
- Lack of flexibility for complex configuration/service dependencies
- Multiple languages for implementing modules
- Full features, high flexibility
- Gentler learning curve
- Focus on consistency and idempotence
- In production, manages exclusively 25 complex servers and complements Quattor on the remaining 237
- Planned to completely replace Quattor on SLC6

For both Quattor and Puppet the configuration code is maintained in a Revision Control System (Subversion).

Conclusions

We are introducing in the ATLAS Online Farm new strategies for configuration management and monitoring. They are performing very well and are providing the expected improvement in maintainability, extending the coverage and flexibility. In addition, they give better control of the system, and deeper insight into its status.

All text/code based configurations are now covered by Subversion, allowing for safe change management, and together with the multiple data sources integrated in ConfdB, this provides a clear structure and a well identified information flow. The introduction of these new technologies in the production system has been gradual and fully transparent, and will continue during 2012, to be completed in the LHC Long Shutdown.