Windows Terminal Servers Orchestration

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**Project objective:**
automate and orchestrate common activities by defining workflows to reduce error-prone manual actions and operational workload

**Microsoft® Orchestrate**
Orchestrator is intended for automation of all on-premises resources. It uses a different runbook engine than Service Management Automation (SMA). Orchestrator relies on a graphical interface to create runbooks. Lack of scripting is one of the reasons to build CERN Windows automation around SMA. Orchestrator is a mature product with many Integration Packs ready to be used.

**Microsoft® Configuration Manager**
Configuration Manager provides a comprehensive solution for change and configuration management. Configuration Manager allows to deploy operating systems, software applications, and software updates. Although not currently implemented, Configuration Manager will be integrated in the workflow in the near future.

**Microsoft® Operation Manager**
Operations Manager provides Windows infrastructure monitoring that is flexible, helps ensure the predictable performance and availability of vital applications, and offers comprehensive monitoring for datacenter. SCOM can be extended by importing management packs (MPs) which define how SCOM monitors systems.

**GitLab**
GitLab Continuous Integration (CI) with Windows Runner

**Simplified Orchestration**

**Workflow Examples**

To provide **redundancy and scalability** Windows Terminal Servers are deployed in form of **clusters**. Each cluster contains a minimum of two nodes. For all clusters the connections are **load balanced** by two HA Proxy servers (active-active). To provide highly available and resilient infrastructure servers utilize **keepalived** software. Each node reports its load to HA Proxy via **feedback agent**. When the load reaches 90% the node is automatically put in drain mode.

For compliance with policies and Windows Terminal Servers (RDS) settings each machine is member of a **Puppet-controlled infrastructure**. The baseline configuration is **applied per host group**. Each cluster has its own dedicated host group. Host group management is done via Foreman software. The baseline is in the form of Puppet code that is version controlled and stored in a **Git repository** (CERN GitLab service).

Most of Windows Terminal Servers are deployed as **virtual machines** in the CERN Cloud Infrastructure powered by **OpenStack** software. They are hosted in projects assigned to different locations in CERN computer center for higher availability. Failure of one hypervisor or network switch will not affect cluster availability. Windows Terminal Servers are deployed with **standard images** customized via Puppet.

For many Windows Server instances CERN uses **operations automation** (Simplified Orchestration) to manage infrastructure. For **high availability** and **scalability** **virtual machines** are used. **Software** is deployed centrally in the database (different locations) and no **GNI alarm** is used.

When the load reaches 90% the node is automatically put in drain mode. To provide high availability and scalability Windows Terminal Servers are deployed in form of clusters. Each cluster contains a minimum of two nodes. For all clusters the connections are load balanced by two HA Proxy servers (active-active). To provide highly available and resilient infrastructure servers utilize keepalived software. Each node reports its load to HA Proxy via feedback agent. When the load reaches 90% the node is automatically put in drain mode. For compliance with policies and Windows Terminal Servers (RDS) settings each machine is member of a Puppet-controlled infrastructure. The baseline configuration is applied per host group. Each cluster has its own dedicated host group. Host group management is done via Foreman software. The baseline is in the form of Puppet code that is version controlled and stored in a Git repository (CERN GitLab service).

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