

Running SAP HANA One on SoftLayer Bare Metal with SUSE Linux Enterprise Server

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Overview

- IBM's Cloud Services development team combined the world of cloud computing with the power of bare metal processing to enable customers to quickly provision bare metal servers running SLES and SAP HANA One using IBM SoftLayer infrastructure
- This session will take you behind the scenes of the SAP HANA One service deployed on SoftLayer and explain how bare metal servers were ordered, provisioned, and managed through automation
- The session will also cover lessons learned, factors to consider, and tips for managing bare metal servers as cloud computing resources
- We'll also highlight the factors that made SLES a natural fit for running SAP HANA One in the cloud

SAP HANA One Service Overview

- In-memory analytics platform intended for development and testing of HANA applications
- Cloud offering that enables:
 - Quick provisioning (in minutes)
 - Create and destroy as needed
 - Hosting by public cloud provider
 - Easy upgrades to newly released versions of HANA
- The entry point into HANA systems with options available for much larger environments

Why the Cloud?

- Quick way to get started
- Flexibility – pay for what you use and destroy the environment when not needed
- Capacity to meet the demand – grow the environment as the team grows
- Licensing included in the service
- Control through APIs
- However, there can be a performance penalty:
 - Noisy neighbor
 - Hypervisor overhead
 - Capacity limits

Bare Metal in the Cloud

- Few cloud providers offer bare metal but IBM SoftLayer does and offers APIs to manage them
- Better performance than VMs (no hypervisor)
- No noisy neighbor issues
- More hardware options (RAM, CPU, GPU, disk configuration, network)
- Hardware can be tailored to meet requirements (specific CPUs, array controllers, disks, etc.)
- Dedicated hardware
- Takes longer to provision than Virtual Machines

Why Bare Metal for SAP HANA One?

- Performance
 - Consistency
 - I/O
- Specific CPUs supported by SAP
- Other SAP HANA offerings on SoftLayer use bare metal
- Prove that bare metal automation can be done on SoftLayer (target of system ready for customer use within 15 minutes of the order)

Obstacles to Overcome

- SAP requirements for HANA One service:
 - Target time for system to be ready for customer after an order is placed
 - OS configuration requirements
 - Specific CPUs that have been supported by SAP for HANA platform
 - Customization of the system for the customer after the order

Why SUSE?

- OS of choice by the SAP HANA One team
- SUSE team worked with us on the steps needed for proper licensing and updates
- Tooling was available for image capture and cloning (xCAT)
- Good support for the hardware used by SoftLayer

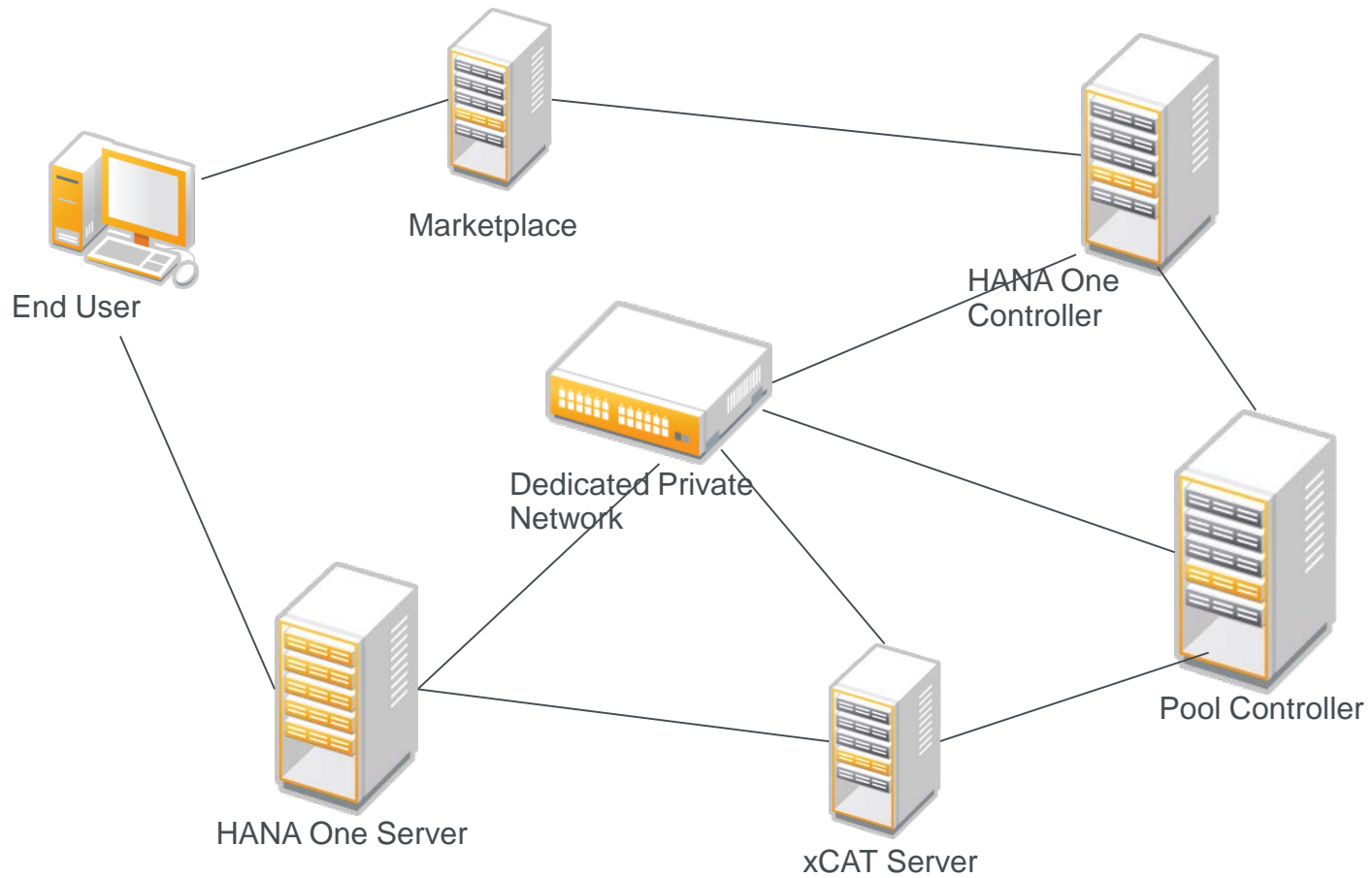
Custom OS Options in SoftLayer

- Using the IPMI interface, an ISO can be mounted from a NAS to a virtual CD drive
 - This is a very manual process
 - Doesn't work for every version of IPMI
- PXE boot can be used to programmatically install a custom OS
 - Tools like Cobbler can simplify this process
- xCAT can be used to create and load custom OS images
 - Enable you to manage large numbers of servers used for any type of technical computing
 - Scripted installation of stateful (diskful) nodes

Building the Base Image

- SAP installed HANA on a system running SLES and customized it for the HANA One service
- IBM and SAP identified the steps that needed to occur post provisioning and set them up to be called when the system started
- IBM team then captured (using xCAT) the image and tested it using customization from the order
- IBM promoted the image between environments and made sure it was ready to use

High Level Architecture



Automated Order and Configuration of Bare Metal Servers

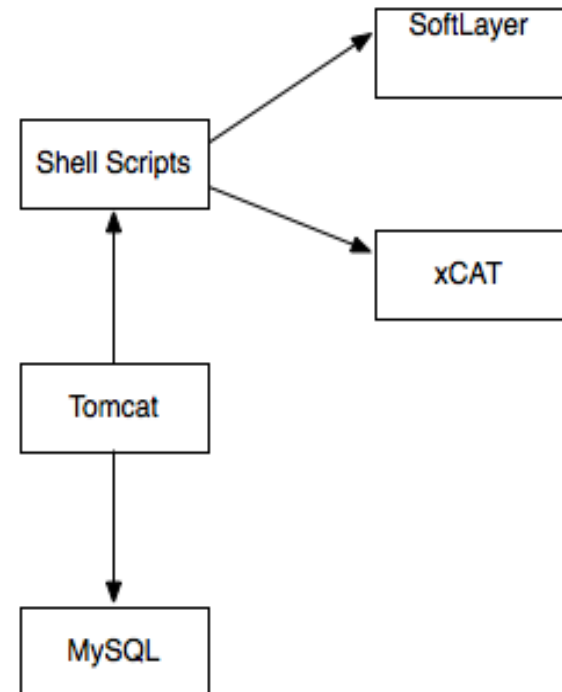
- SoftLayer API allows for ordering custom hardware
- Details like CPU type, VLAN, RAM, and disk are tailored to optimize SAP HANA One
- xCAT was used to install a SUSE image on newly provisioned servers
- When the pool runs low on available servers, it calls the SoftLayer API to order more servers
- When new servers are fully provisioned, they are handed to xCAT for customization

Pool Controller

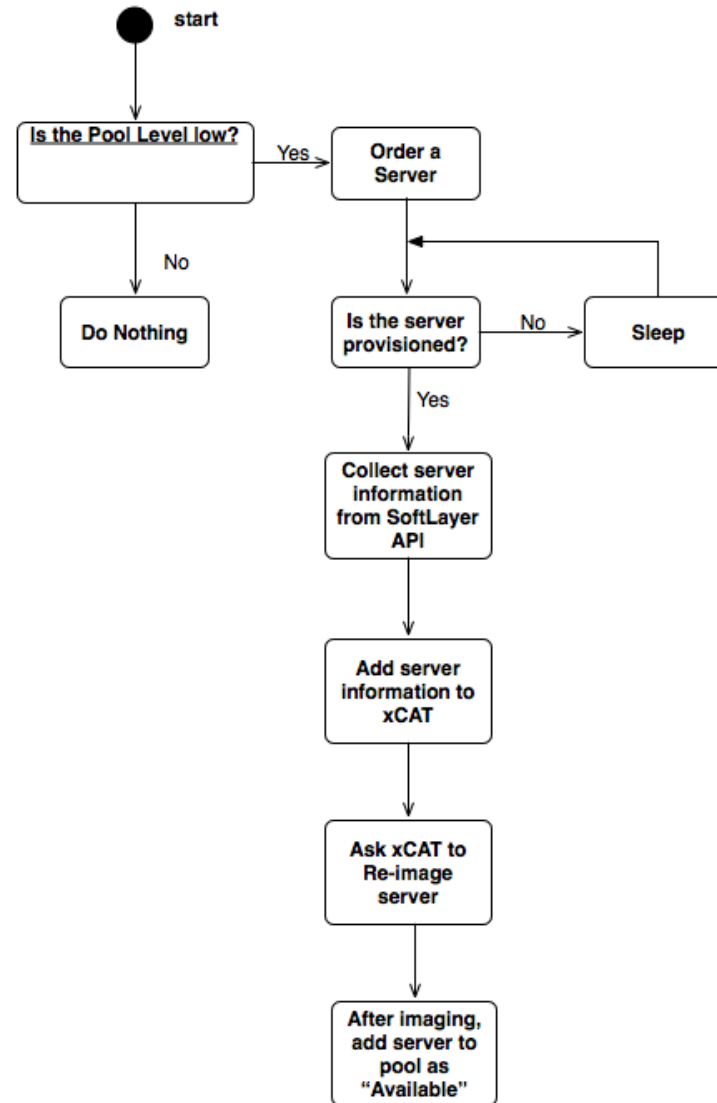
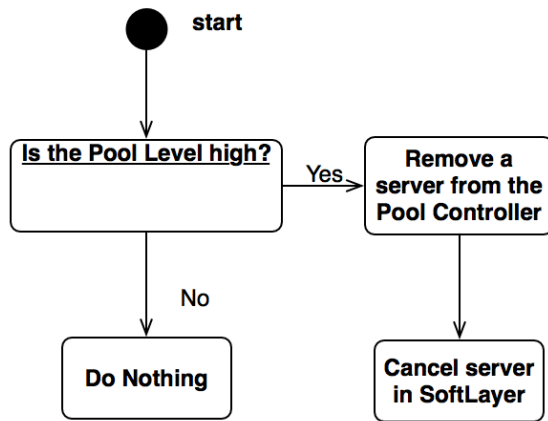
- Manages a pool of bare metal servers
- Servers are in a powered-off state until they're needed
- Boot time is under 4 minutes (after order is placed)
- Saves provisioning time
- Controls number of idle servers in the pool to reduce costs
 - When the number of idle servers is low, more servers added
 - When there is a surplus of idle servers, some are canceled

Pool Controller Architecture

- REST API runs on Tomcat
- API manages server pool
- MySQL DB records server status
- Shell Scripts place server orders/cancellations with SoftLayer
- Shell Scripts add/remove servers from xCAT

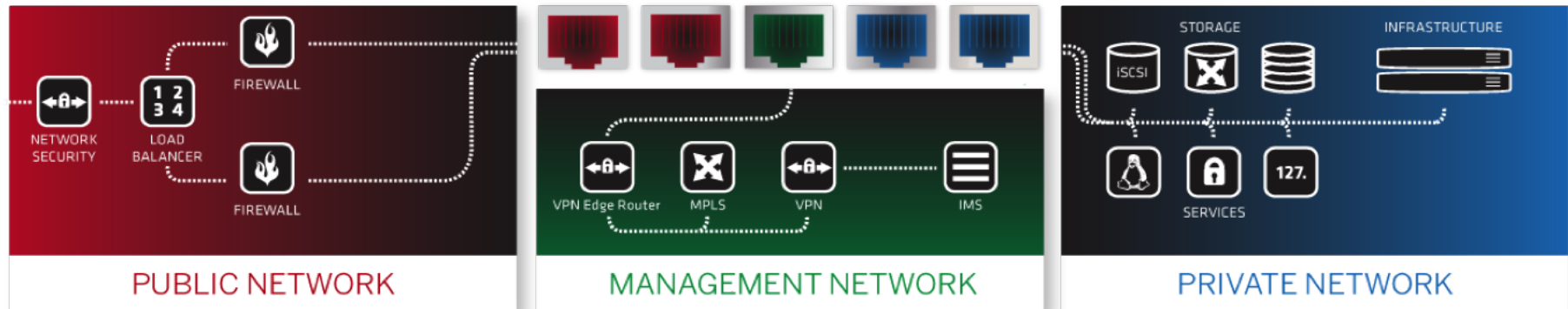


Pool Controller “Free Server” Level



3 Network Architecture

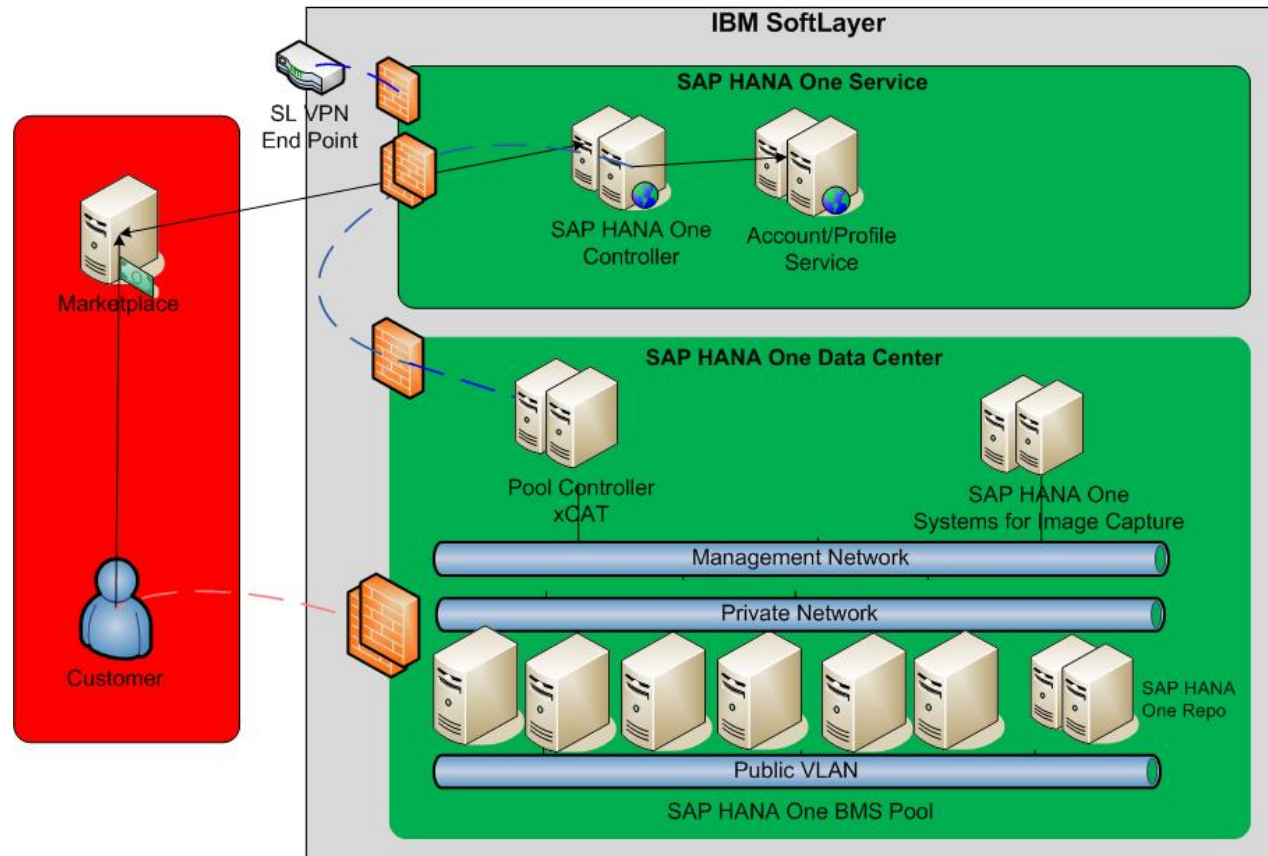
- SoftLayer offers a 3 network architecture with public, private, and management networks.



This network design was essential to properly secure and manage the servers.

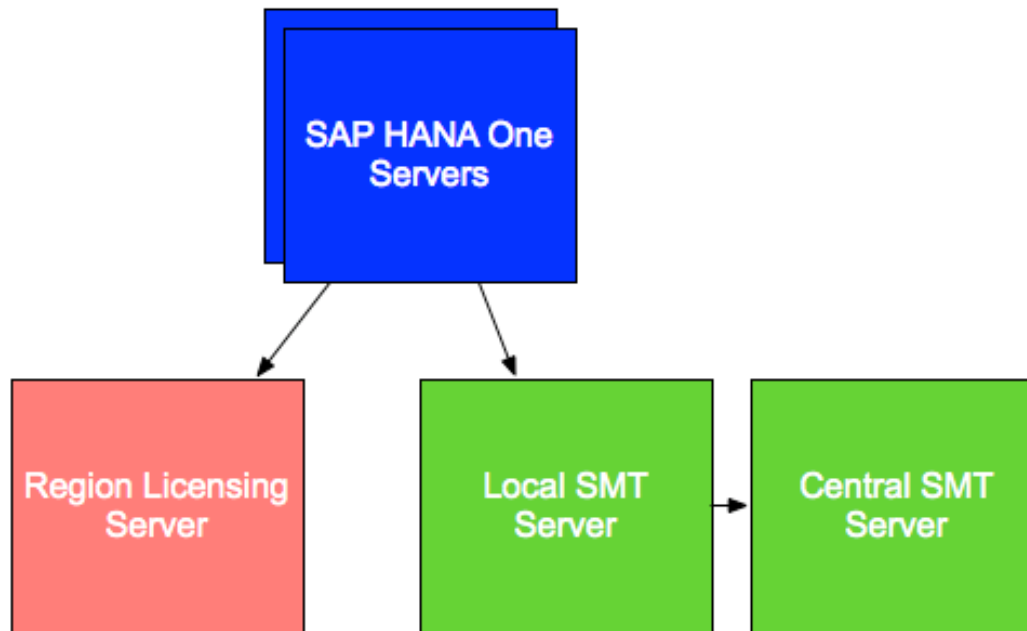
VLAN Management and Security

- VLAN and firewall rules were put in place to secure the systems and allow them to be managed as needed:



Licensing and Patch Management

- To properly license and make patches available, IBM used a SUSE cloud provider model with SMT and Region server in each data center:



Questions?

Learn more at the IBM Cloud
Marketplace

<https://marketplace.ibmcloud.com/apps/3997>

Thank you.







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