IBM PureFlex Systems
IBM Image Construction and Composition Tool
Agenda

• IBM Virtual Appliance Factory (VAF)
• Tools
  • Product Activator Development Kit (PADK)
  • IBM Image Construction and Composition Tool
• Demo
What’s inside?
Integrated Infrastructure
*Designed for future generations of technology*

**1 System** for compute, storage and systems networking

Up to 896 cores, 43 TB memory, 480 TB storage and 26M IO operations per second, per rack

Up to 4 chassis per rack, scalable up to 4 racks

10U Chassis
14 Node Bays
Integrated Compute Nodes
No compromise designs for full performance

Support multiple architectures using up to 14 POWER7 or x86 nodes per chassis

Support for applications across 4 operating environments

Secure startup for both physical and virtual environments

POWER7
AIX®, i®, Linux®

x86
Linux®, Windows®
Integrated Storage

Store more for less

- Virtualize existing storage – IBM’s or competitor’s - and migrate data without disruption

- Optimize application performance with Flash storage and Intelligent Storage Tiering

- Double storage efficiency and improve transactional performance up to 300%

Storwize V7000
Integrated Systems Networking

Pay as you grow scalability

- Low latency, terabit switching and network bandwidth-on-demand
- Virtual Machine Ready networking
- 80Gb of Ethernet bandwidth and network intelligence to every compute and storage node

Ethernet
- 40Gb uplinks
- 10Gb, 1Gb
- FCoE

Fibre Channel
- 16Gb, 8Gb

Infiniband
- QDR, FDR
Integrated Networking...Design Matters
Scale-in Systems Networking designed for virtualization and cloud

1/2 the latency by avoiding most top of rack traffic

Fewer servers required to overcome bottlenecks

Faster VM migrations for better pooling and cloud performance
Virtualization Expertise

Virtualize all resources for highest utilization

54% more virtual machines per compute node

Support for tens of thousands of applications across 4 hypervisors

Virtualize all resources and automatically manage with highest utilization
Simplified Management Experience

Management integration across all physical and virtual resources

Single management console for all resources

Manage workloads while the system automatically manages resources

Thousands of end points at your fingertips with Quick Find

Flex System Manager
Designed for Cloud

_Dramatically improve system utilization_

- System Pools / Cloud

- 4-click setup for rapid deployment

- Cloud management across multiple architectures and hypervisor environments

- Speed SAP server provisioning from weeks to minutes
## SmartCloud Entry options with PureFlex

- IBM PureFlex System - “Starting Configuration” editions
- SmartCloud Entry component Included in these configurations

<table>
<thead>
<tr>
<th>Express</th>
<th>Standard</th>
<th>Enterprise</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Management Node (Standard sw)</td>
<td>- Management Node (Advanced sw)</td>
<td>- Management Node (Advanced sw)</td>
</tr>
<tr>
<td>- 10Gb Network Switch</td>
<td>- 10Gb Network Switch</td>
<td>- 2 x 10Gb Network Switch</td>
</tr>
<tr>
<td>- 8Gb Fibre Chan. Sw.</td>
<td>- 2 x 8 Gb Fibre Chan Sw</td>
<td>- 2 x 8 Gb Fibre Chan Sw</td>
</tr>
<tr>
<td>- V7000 Storage w/2 ssd Power +8 hdd</td>
<td>- V7000 Storage w/2 ssd Power +16 hdd, x +4 hdd (sce only)</td>
<td>- Power only TOR = 2 Eth, 2 FC (expansion for sys x)</td>
</tr>
<tr>
<td>- 2 PS 4 fans</td>
<td>- 4 P/S 6 fans</td>
<td>- V7000 Storage w/ 4 ssd</td>
</tr>
<tr>
<td>- Rack w/Gray door</td>
<td>- Rack w/Gray door</td>
<td>- Power +16 hdd, x +4 hdd (sce only)</td>
</tr>
<tr>
<td>- Chassis</td>
<td>- Chassis</td>
<td>- 6 PS 8 fans</td>
</tr>
<tr>
<td>- SCE (default off)</td>
<td>- SCE (default on)</td>
<td>- Rack w/Gray door</td>
</tr>
<tr>
<td>- Lab Services (3 days)</td>
<td>- Lab Services (5 day)</td>
<td>- Chassis</td>
</tr>
<tr>
<td>- Base warranty + from TSS*: +3 yrs w/1 microcode /yr</td>
<td>- Base warranty + from TSS*: +3 yrs w/1 microcode/yr + WSU to 24x7 same day + 3 yrs 9x5 Advocate</td>
<td>- SCE (default on)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Lab Services (7 days)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Base warranty + from TSS*: +3 yrs w/2 microcode/yr + WSU 24x7 same day</td>
</tr>
</tbody>
</table>

* Selectable
- P,x or IPL Compute Node + Operating System + Virtualization

* Selectable
- P,x or IPL Compute Node + Operating System + Virtualization

* Selectable
- 2P or 2x IPL Compute Node + Operating System + Virtualization

* Offering name may vary across Geos and some content may not be available in all countries. ** TSS was previously known as MTS
Goal: Prepackaging for rapid cloud deployment

The fast path to cloud-ready virtual appliances….

1. **Initialization**: evaluate requirements, skill-transfer, establish project timeline with roles and responsibilities

2. **Image Building**: build images with IBM tooling (Meta-Data), create new activation programs / sequencing, apply IBM Virtual Solutions Activation Engine (VSAE) based on standard DMTF Open Virtualization Format (OVF) to build and deploy software virtual appliances

3. **Validation**: document virtual appliance, build base images, validate at IIC with IBM Systems Director, Flex System Manager, and IBM SmartCloud Entry.
How to enable applications for IBM PureFlex System

IBM Virtual Appliance Factory
with Image Construction and Composition Tool

Capture once, deploy with consistency and ease

Traditional Workload Deployment Components

Build Base Virtual Image

Add bundles that contain product software and activators

Capture

Store in Image Repository, ready to be deployed using VMControl, Flex System Manager, IBM SmartCloud Entry, etc
What is an Open Virtualization Appliance?

- Contents of an OVA package:
  - Meta-data descriptor compliant with OVF
  - Zero or more files

- OVF descriptor:
  - XML document describing product details, virtual hardware requirements, and licensing

- Files:
  - Images and data disks
  - Images have one of two forms
    - Installable image
      - Files or disks containing install artifacts for an OS and/or applications
      - Requires a boot server on which to run the installation
      - ISO images are examples
    - Bootable or Cloneable image
      - Files or disks containing bootable OS and possibly installed applications
      - The image is scrubbed to become a master image
      - Customization maybe required before deployment
      - A RAW image is an example
How does image activation take place?

- Master image is built with Activation Engine inside
  - A scripting engine that starts at boot-up before application services
  - Reads the virtual image with OVF xml for configuration
  - Calls application specific Configuration Unit that sets points of variability in application
  - Releases startup to applications
- Other uses of activation engine
  - Get additional assets
  - Attach state based data and configuration for stateless images
## ISV Application Topology

### Activation Engine Extensions Configuration Script Parameters

<table>
<thead>
<tr>
<th>Label</th>
<th>Variable Name</th>
<th>Default Value</th>
<th>User Configurable</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>WebSphere Application Server Express v7.0</strong></td>
<td>WAS Nodename</td>
<td>was_nodename</td>
<td>true</td>
</tr>
<tr>
<td></td>
<td>WAS Admin Password</td>
<td>wasadmin_password</td>
<td>true</td>
</tr>
<tr>
<td></td>
<td>WebServer Name</td>
<td>webserver_name</td>
<td>true</td>
</tr>
<tr>
<td></td>
<td>WebServer Port</td>
<td>web_port</td>
<td>true</td>
</tr>
<tr>
<td></td>
<td>WebServer Install Root Directory</td>
<td>web_install_root</td>
<td>/opt/IBM/HTTPServer</td>
</tr>
<tr>
<td></td>
<td>WebServer Hostname</td>
<td>hostname</td>
<td>true</td>
</tr>
<tr>
<td></td>
<td>WebServer Admin UserID</td>
<td>admin_userid</td>
<td>true</td>
</tr>
<tr>
<td></td>
<td>WebServer Admin Password</td>
<td>wasadmin_password</td>
<td>true</td>
</tr>
<tr>
<td></td>
<td>DB2 Enterprise v9.5</td>
<td>Instance Password</td>
<td>true</td>
</tr>
<tr>
<td></td>
<td>Instance User</td>
<td>db2inst1_username</td>
<td>false</td>
</tr>
<tr>
<td></td>
<td>Instance Group</td>
<td>db2inst1_group</td>
<td>false</td>
</tr>
<tr>
<td></td>
<td>Name for database</td>
<td>db_name_new</td>
<td>true</td>
</tr>
<tr>
<td></td>
<td>Database Action</td>
<td>db_action</td>
<td>true</td>
</tr>
<tr>
<td></td>
<td>Hostname</td>
<td>db2_hostname</td>
<td>false</td>
</tr>
</tbody>
</table>

**Etc.**
Product Activator Development Kit (PADK)

- Integrate Development Environment (IDE) Eclipse plug-in
- Streamlines process of creating, testing, and validating program activators (i.e. Configuration Activation Scripts)
- Supports multiple programming languages (e.g. Python)
- Simplifies process of creating ICCT Software Bundles
IBM Image Construction and Composition Tool

- Web based tool
- Manage cloud providers
  - PowerVM Express
  - KVM Express
  - ESX
- Build and manage images
- Build and manage software bundles
Image building blocks

Cloud provider
- Target environment for deploying the image (IBM Workload Deployer, VMware, SmartCloud Enterprise, SmartCloud Provisioning)

Base image
- Starting point for building a virtual image that contains operating system and virtual machine characteristics; might contain other pre-installed software

Software bundles
- Defines information about software to include in an image
- Silent installation and configuration; deployment-time configuration and activation
- Reset and clean-up

Diagram:
- Base image: 1 CPU, 30GB HD, RHEL 5.4
- Software bundles: RAM, DB2, Tomcat
- New virtual image: RHEL 5.4, DB2, Tomcat
# Virtual Application Factory Technical Enablement Process

## Virtual Appliance Factory for Power AIX: 10 ISV Days

### Prepare:

**IBM + ISV (1 Hr)**
- Cloud Computing for ISVs with IBM Systems

**IBM + ISV (1 Hr)**
- ISV Application Packaging for IBM Cloud

**IBM + ISV (4 Hrs)**
- Develop Project Plan / Application Topology Review

### Phase 1:

**IBM + ISV (4 Hrs)**
- Application Install / Config diagram interface Deep Dive

**IBM**
- Provision build and test environment at IIC

**IBM**
- Troubleshoot issues with tooling and environment

**IBM**
- Troubleshoot issues with tooling and environment

**ISV (1-2 Days)**
- Create Virtual Appliance Base Images

**ISV (1-2 Days)**
- Create Virtual Appliance Bundles

**ISV (1-2 Days)**
- Write / Test Activation Engine Extension scripts

**ISV (optional)**
- Deploy and Validate ISV application

**ISV (4 Hrs)**
- Export OVA and Validate with VMControl

### Phase 2:

**ISV**
- Reuse Virtual Appliance Template from Phase 1

**IBM**
- Provision build and test environment at IIC

**IBM**
- Troubleshoot issues with tooling and environment

**ISV (1 Day)**
- Create new Virtual Appliance Base Images (w/fixpack)

**ISV (4 Hrs)**
- Create New Images based on Virtual Appliance Template

**ISV (4 Hrs)**
- Validate deployment with hardware

**ISV (optional)**
- Deploy and Validate ISV application
Next Steps for ISVs

1. Nominate your solution to be “Ready for IBM PureSystems”
2. Work with IBM Innovation Center to complete readiness assessment
3. Build ISV Virtual Appliance and test on IBM PureFlex System with IBM SmartCloud Entry
4. Create solution description and download page and Global Solutions Directory display is updated
5. Sign “Ready for PureSystems” Supplement
6. Become “Ready for IBM PureSystems” and go to market with IBM

Contact your IBM representative, your local IBM Innovation Center or visit ibm.com/partnerworld/puresystems to get started
ISVs Take Action

Nominate your solution

Ready for PureSystems

PureSystems Centre

Try PureSystems for 90 days

Virtual Appliance Factory

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Additional Materials

• IBM Virtual Appliance Factory landing page  
  ibm.com/partnerworld/cloud/vaf

• Getting started with IBM Virtual Appliance Factory: IBM Business Partner solution roadmap  
  ibm.com/partnerworld/page/roadmap/getting_started_with_vaf

• IBM Virtual Appliance Factory: IBM Image Construction and Composition Tool Education  
  ibm.com/partnerworld/page/stg_com_eis_vaf_education_roadmap
Create Smart Virtual Appliances with IBM Image Construction and Composition Tool

1. Image Construction and Composition Tool architecture
2. Setting up the Virtual Appliance Build Environment
3. Product Activator Development Kit
4. KVM Express Cloud Provider
5. PowerVM Express Cloud Provider
6. ESX Cloud Provider
7. Constructing Simple Virtual Appliance
8. Constructing Complex Virtual Appliances
9. Virtual Appliance Deployment Options
10. Best Practices
Technical Enablement Workshop and Tool Demo
ISV Workshop Engagement

Questions

• Solution Topology
  • How many tiers in the solutions?
    (e.g. a 3-tier could be DB Server, Application Server, and Web Server)
  • What software components are required per tier, including OS and middleware?
  • Do you have dependency on 3rd party software or hardware?
  • What are the typical requirements per tier?
    (i.e. CPU, Memory, Disk)

• Installation and Configuration Questions
  • How do you deploy today?
  • Do you have scripts to automate installation?
  • Do you have scripts to automate configuration?

• Software Bundle: Install script vs Configuration script
  • Install script runs during development phase while building virtual appliance
  • Configuration or Activation script runs during customer deployment

• Software Bundle: Install script Parameters (to make more reusable)
• Software Bundle: Configuration script Parameters (customer dependent)
Redbook: Chapter 7. Constructing Simple Virtual Appliance

• Simple Sample
  • Solution Topology: 1-tier solution
  • Middleware: IBM WebSphere Application Server Community Edition (WASCE)
  • Solution: Plants by WebSphere
  • Installation – can be done during build synchronization time
    • WASCE Installation Script (Install.sh)
  • Configuration – needs to be done at deployment time on customer system
    • WASCE Configuration Script (ConfigWASCE.sh)
    • Plants by WebSphere Configuration Script (activate.sh)

• No need to use Product Activator Development Kit (PADK) since Configuration scripts already exist

• Use Image Construction and Composition Tool to:
  • Import base image
  • Create two software bundles
  • Extend base image, add software bundles, synchronize
  • Capture and Export to create new virtual appliance
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