Configure. Manage. Monitor

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A Story...

Fred

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Big Bag 'O Scripts & ssh
Goal

- Build a complete infrastructure to Configure, Manage and Monitor Linux Systems
- Based on DMTF/CIM technology
- Across multiple Linux distributions
- As an Open Source project
Strategy

Provide a standardized remote interface to configure, manage, and monitor bare metal production Linux servers.
A Platform for Manageability

- Low level functions to remotely *configure* and *manage* bare metal production Linux servers (and virtual machine guests)
- Configuration, Management & Monitoring infrastructure
- Standards based
- Open and extensible
- Open, upstream project: [www.openlmi.org](http://www.openlmi.org)
- Delivered as part of OS
Manageability Technology Choice

- Evaluated many alternatives
- Chose DMTF/CIM
  - Architecture, infrastructure, object models, existing uses
  - OpenPegasus CIMOM
  - WBEM client interface
    - Scripting & CLI friendly
    - Multiple language bindings
  - Development toolchain – CMPI based
  - CIM Models: SMASH & SMI-S
    - Subset, with extensions and modifications...
    - Based on our understanding
    - Modified to support Linux implementation
OpenLMI System Manageability Infrastructure

- Local agents installed on managed systems
- Agents and Object Broker supplied as part of OS
  - Open project
  - Initial delivery on Fedora
- Remote API
  - Can also be used locally
- Agents and tools can be developed by Red Hat, community, 3rd parties, customers
Agents

- Agents are Functional Modules
  - Get/Put attributes
  - Methods & relations
- Standard Interfaces
- Introspection
- Agents do all the work
- Toolchain for developing Agents
  - UML schema compiled to produce code skeleton
- Agents can be written in C/C++ or Python
- Agents can be call/response or asynchronous event driven
OpenLMI Client Interfaces

• LMI Shell
  • Enhanced CLI & scripting environment
  • Admin Friendly

• Python API
  • Use from Python modules
  • Good interface for OpenLMI Apps

• C/C++ API
  • Powerful interface for writing Apps or integrating with existing Apps

• Java
  • Write Java Apps
  • Easy interface with JBoss

• CLI
  Can be used directly or from shell script
OpenLMI in Fedora 19

- **Implementation:**
  - DMTF/CIM technology stack
  - Https transport (no general Web server)

- **Included Agents:**
  - Storage
  - Network
  - System Services
  - Power Management
  - Local User Management (basic)
  - Software Management
  - System Monitoring (basic)
  - System Information & Configuration
What can you do with OpenLMI?

- Storage
- Networks
- Users
- Software
- Power
- System Services
- System configuration
- Active Directory
Storage

- Enumerate local drives (block devices).
- Obtain information on drives and luns including I/O statistics.
- Partition, including support for GPT partitions.
- Format – EXT2, EXT3, EXT4, XFS and btrfs.
- Build RAID sets with mdraid.
- Perform logical volume management with lvm.
- Mount/unmount file systems.
- Manipulate block devices: iscsi, Fibre Channel, and FCoE.
Network

- Enumerate NICs.
- Get information on NICs (MAC address, link status, etc.)
- Bring up/bring down NICs.
- Set IPv4 address and netmask.
- Set IPv6 address.
- Set default gateway.
- Set dns servers.
- Manage static routes.
- Configure network bridging and bonding.
- Notifications (events) for changes in network devices and settings.
Services

- Enumerate system services and their status.
  - Service name.
  - Service description.
  - Service status.
- Start/Stop/Restart/Reload a service.
- Enable/Disable a service.
- Configure a service to start at boot.
- Event based monitoring of service status.
- Installation/Update/Removal of a service (using Software Management)
Software Management

- List all rpm based software installed on a system (including version).
- List available repositories.
- List available packages per repository.
- Search repositories.
- List files owned by a package.
- Perform a package integrity check.
- Install/Update/Uninstall software.
User Accounts

• Manage local accounts.
• List user accounts and settings.
• Create/Update/Remove user accounts and groups.
• Query and Change user account settings.
• Notifications (events) for account changes.
Future

- Extend existing Providers
  - More capabilities
  - Indicator support
- New Providers
  - Community
- Client Support
Benefits

- **More Productive Sysadmins**
  - Familiar environment
  - Standard API
  - Scripting friendly environment
  - Manage remote systems without logging in locally

- **Shorter learning curve for Linux System Administration**
  - Common framework across disparate subsystems

- **Foundation for Automation**

- **Can be used by management platforms**
What is Red Hat doing?

- **Building Providers**
  - Largely based on SMASH & SMI-S
  - Difficult to understand and apply CIM models
  - Need help

- **Working with Upstream Projects**
  - Bug fixes & enhancements, including OpenPegasus

- **Founding an Upstream Community**
  - [www.openlmi.org](http://www.openlmi.org)
  - Participation welcome!

- **Building Client Tools**
What is Red Hat Doing Different?

- **Building Providers that *change the system***
  - Configure storage & networks
  - Manage system services, install software, create users
  - *Plus* monitor and query
  - Previous efforts focused on query & monitor (e.g. sblim)

- **Including Providers in the OS**
  - Greater customer acceptance

- **Founding an Upstream Community**
  - Full Open Source implementation

- **Building Client Tools**
OpenLMI Challenges

- Understanding the CIM models
  - Tremendously steep learning curve

- Implementing the CIM models
  - Models are not “implementation friendly”

- Integration of 3rd Party Providers
  - HW RAID configuration, SAN Array & Switch Configuration
  - Closed source Providers

- Security
  - Username/password in each command

- Building a vibrant open source community
The Opportunity

- Give us requirements and feedback
- Evaluate OpenLMI in Fedora 19
- Get involved at OpenLMI.org
  - Testing
  - Use cases
  - Scripts
  - Agents
  - Tools
Key Information

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