Configure. Manage. Monitor

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Presented at the

Management Developers Conference

July 2013

A Story...

Fred

Big Bag
'O
Scripts
& ssh

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Google

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*

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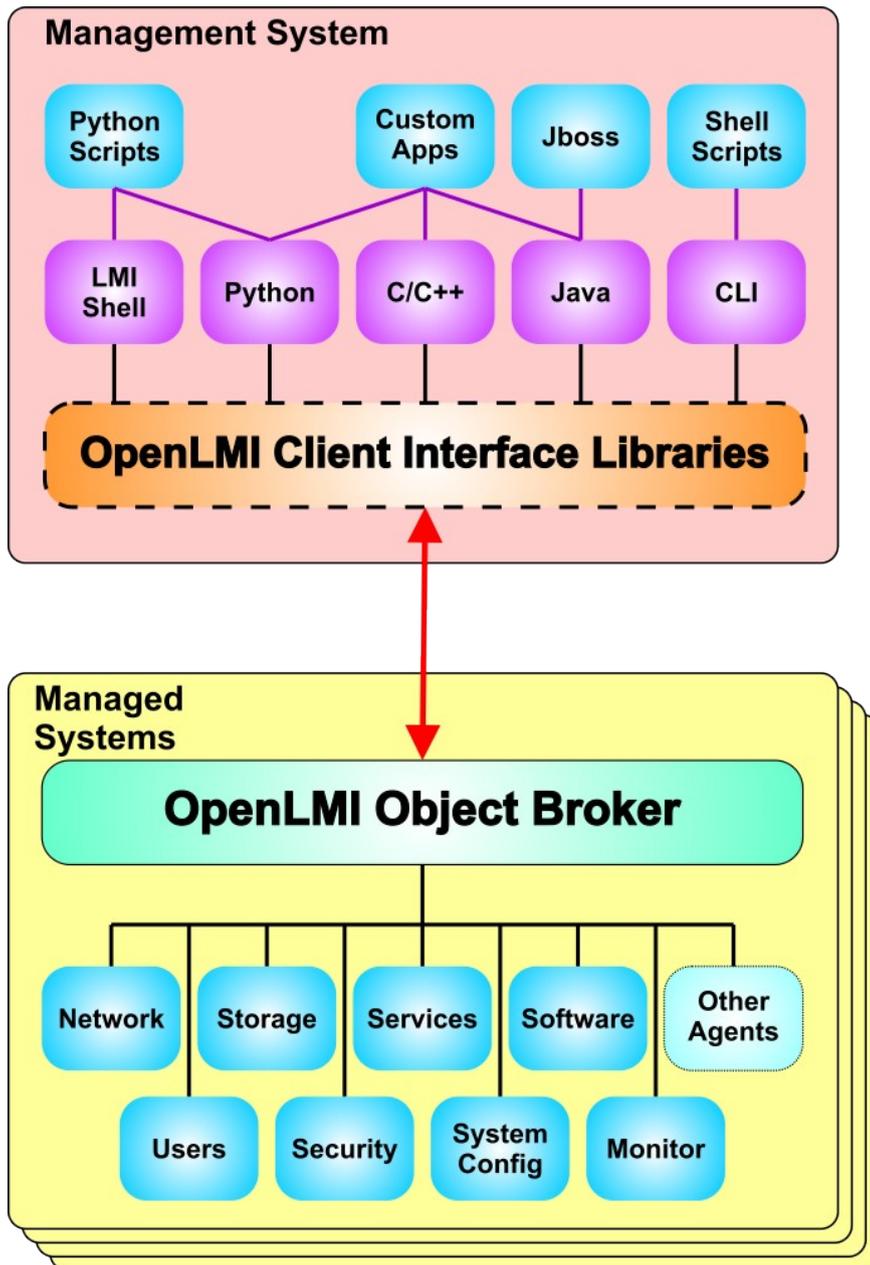
- Local agents installed on managed systems
- Agents and Object Broker supplied as part of OS
  - Open project
  - Initial delivery on Fedora
- Remote API
  - Can also be used locally
- Agents and tools can be developed by Red Hat, community, 3rd parties, customers

Agents

Managed Systems

OpenLMI Object Broker

Network | Storage | Services | Software | Other Agents

Users | Security | System Config | Monitor

- 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
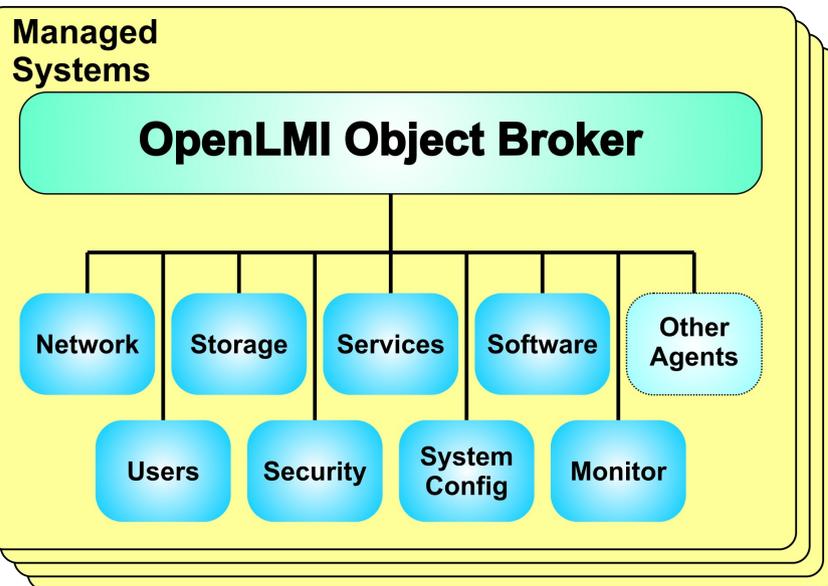
OpenLMI Client Interfaces

- 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
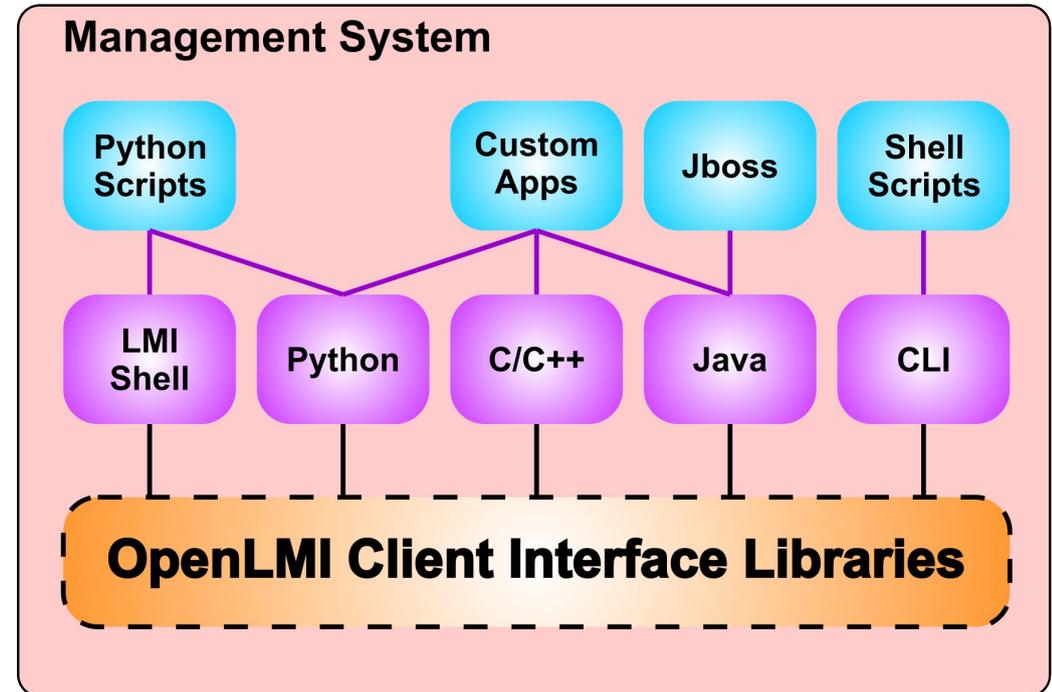
- Java
  - Write Java Apps
  - Easy interface with JBoss

- CLI

Can be used directly or from shell script

OpenLMI in Fedora 19
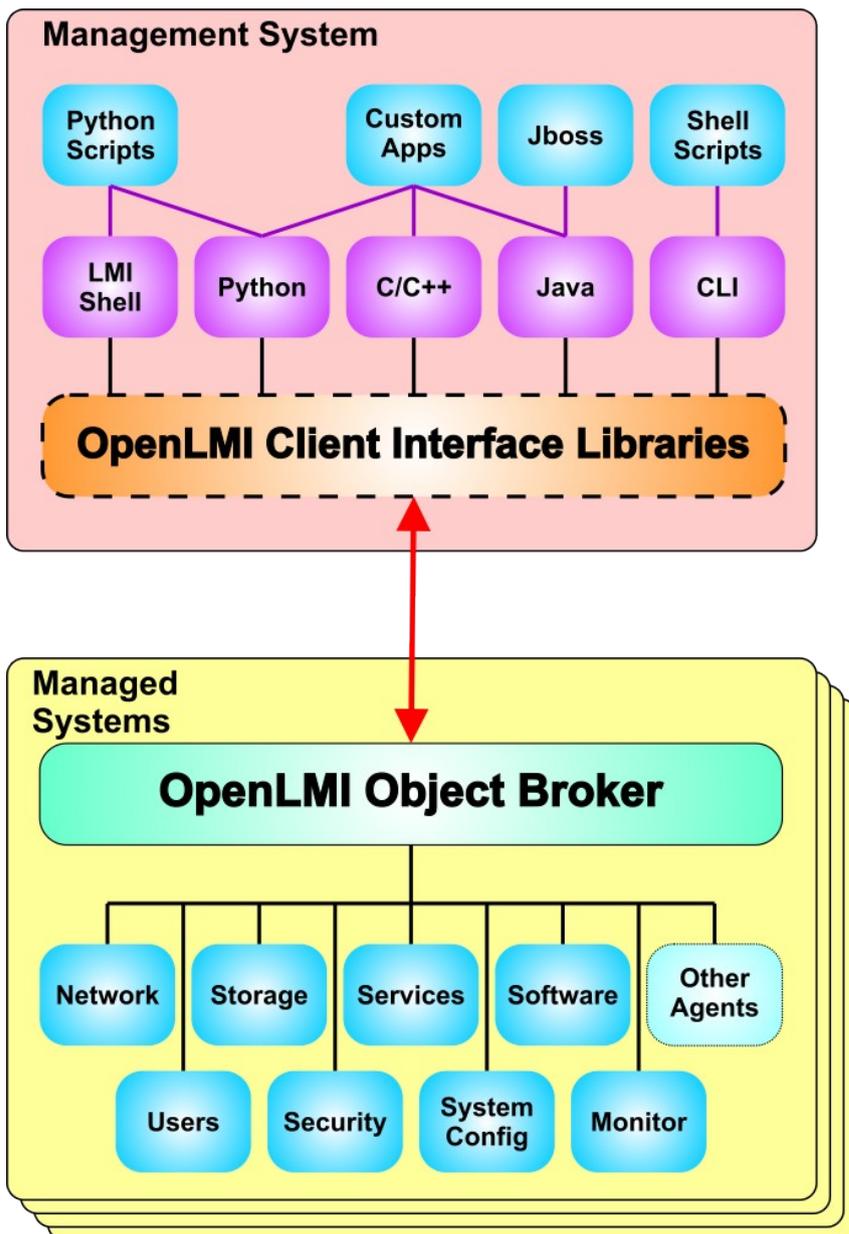
- **Implementation:**
  - DMTF/CIM technology stack
  - Https transport (no general Web server)
- **Included Agents:**
  - Storage
  - Network
  - System Services
  - Power Management
  - Local User Management (basic)
  - Software Management
  - System Monitoring (basic)
  - System Information & Configuration

What can you do with OpenLMI?

- **Storage**

- **Networks**

- **Users**

- **Software**

- **Power**

- **System Services**

- **System configuration**

- **Active Directory**
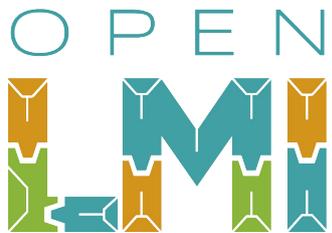
Storage

- **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.**
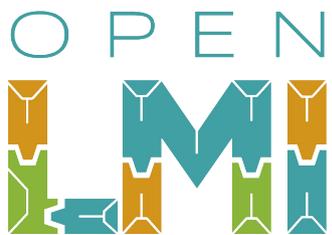
Network

- **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.**
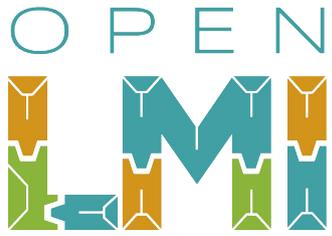
Services

- **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)**
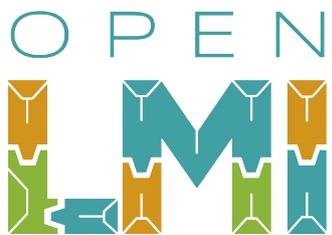
Software Management

- **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.**
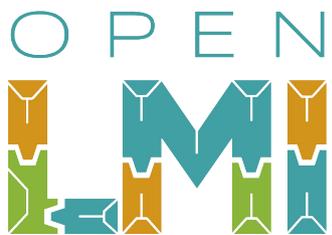
User Accounts

- **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.**
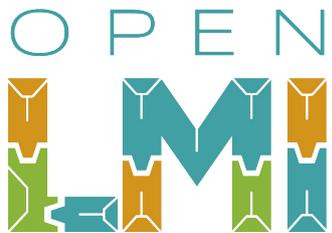
Future

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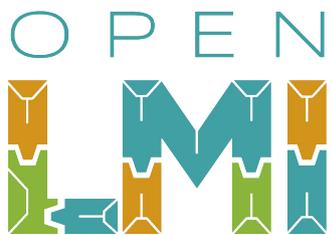
Benefits

- **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**
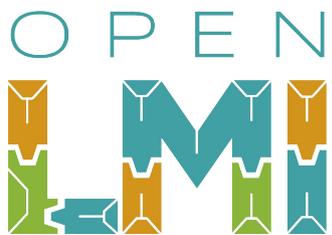
What is Red Hat doing?

- **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

  - Participation welcome!

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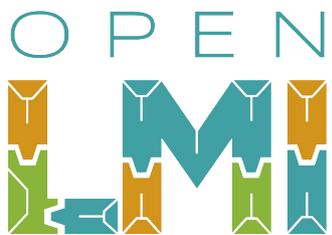
What is Red Hat Doing Different?

- **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**
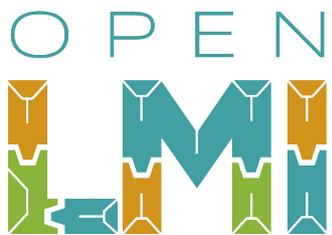
OpenLMI Challenges

- **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

- **Russell Doty: rdoty@redhat.com**

- **www.openlmi.org**

- **TechPonder.wordpress.com**

- **lists.fedorahosted.org/mailman/listinfo/openlmi-devel**

- **#openlmi on freenode**