



Systems Management in Linux: WBEM, CIM and SBLIM

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Agenda

- Linux and Systems Management
- Industry Trends
- WBEM and CIM
- SBLIM Providers
- CIM Clients, Programming Interfaces
- Code Walk through/Demo



Linux and Systems Management

- Proprietary vs. Open Source Operating Systems
- No consistent approach
- Fragmented group of companies and individuals
- Perception: proprietary Manager/Agent models too expensive
- Commoditization of out-of-the-box base management applications
- Need for cross-vendor, Advanced Management Apps
- Platform owners willing to agree on common manageability infrastructure and extendable models
- Standard bodies understanding that just publishing standards is not enough



Industry Trends

- WBEM technologies are getting attention!
 - WBEMServices from Sun® (Java®)
 - OpenCIMOM from SNIA (Java)
 - OpenWBEM from SCO (C++)
 - Pegasus from The Open Group (C++)
- Lowering entry costs of CIM/WBEM based management solutions
- WBEMsource group by major IT vendors and standard bodies to address inter-operability and make available open source, industrial strength implementations of relevant WBEM standards



Web Based Enterprise Management

- a set of management and Internet standard technologies developed to unify the management of enterprise computing environments.
- provides the ability for the industry to deliver a well-integrated set of standard-based management tools leveraging the emerging Web technologies. (DMTF)
- Core set of standards that make up WBEM:
 - Common Information Model (CIM) standard
 - encoding : xmlCIM Encoding Specification
 - transport mechanism: CIM Operations over HTTP
- CIM Object Manager (CIMOM) is a name loosely used by the industry to describe server implementations providing access to instances of CIM models.

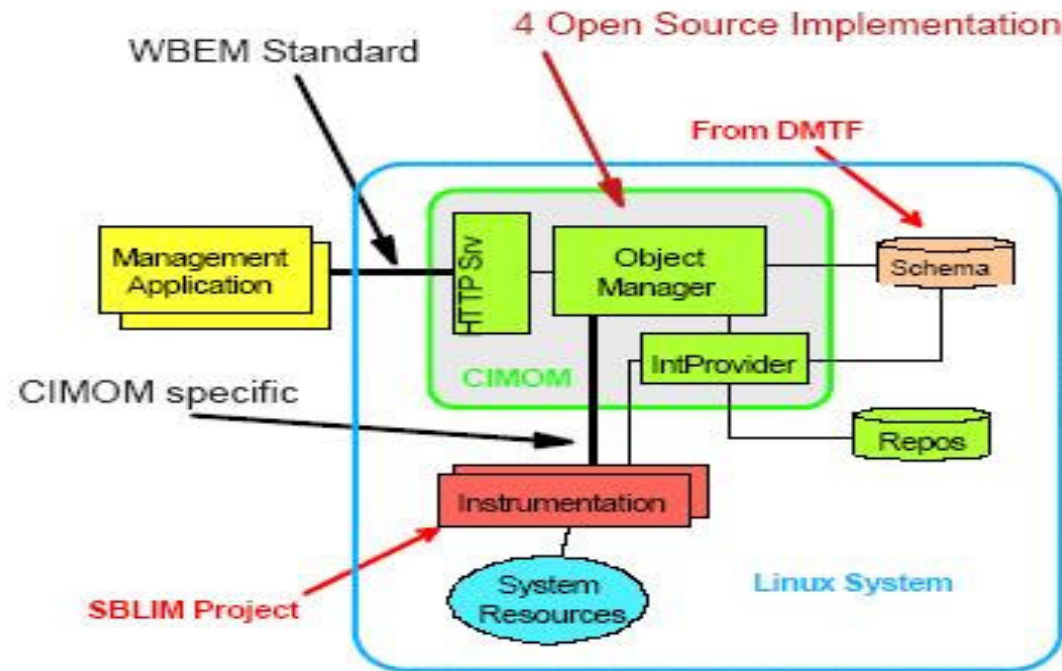


Reasons for CIM/WBEM

- **Data Modelling Aspects**
 - Rich inventory of Management Objects (Schema)
 - Object Orientation facilitates Extensibility and QoS Distinctions
 - Associations provide unprecedented flexibility
 - Indication Model for advanced Management

- **Implementation Aspects**
 - Real interoperability through remote protocols
 - standard: CIM (XML) over HTTP(S)
 - others to follow: ASN.1, WSDL
 - Variety of Implementations
 - CIMOMs: e.g. Pegasus, SNIA CIMOM, WBEM Services, OpenWBEM
 - Mappings to LDAP, SNMP
 - Web Services, OGSA

WBEM and CIMOM – The Big Picture





SBLIM Project (Open Source)

- Standards Based Linux Instrumentation for Manageability
 - sblim-cim4linux Linux model description
 - sblim-npi Native Provider Interface
 - sblim-wbemcli Line command utility
 - sblim-psg Provider Skeleton Generator
 - sblim-base Linux Base providers
 - sblim-fsvol File System and LVM instrumentation
 - sblim-params Linux Kernel parameters
 - sblim-rpm RPM instrumentation
 - sblim-service Linux services instrumentation for RedHat



CIM Client Applications

- SBLIM Reference Implementation (SRI) provides a front-end to WBEM based systems (and more).
- WBEMCLI - a standalone, convenient systems management utility for CIMOM access. Invocable from Shell and Perl scripts. (to test providers)
- Event Subscription Tool (evsub) - for Event Handling. User configures the module by an xml-file. Reactions: PopUp-Handler, E-mail-Handler, Shell-Handler

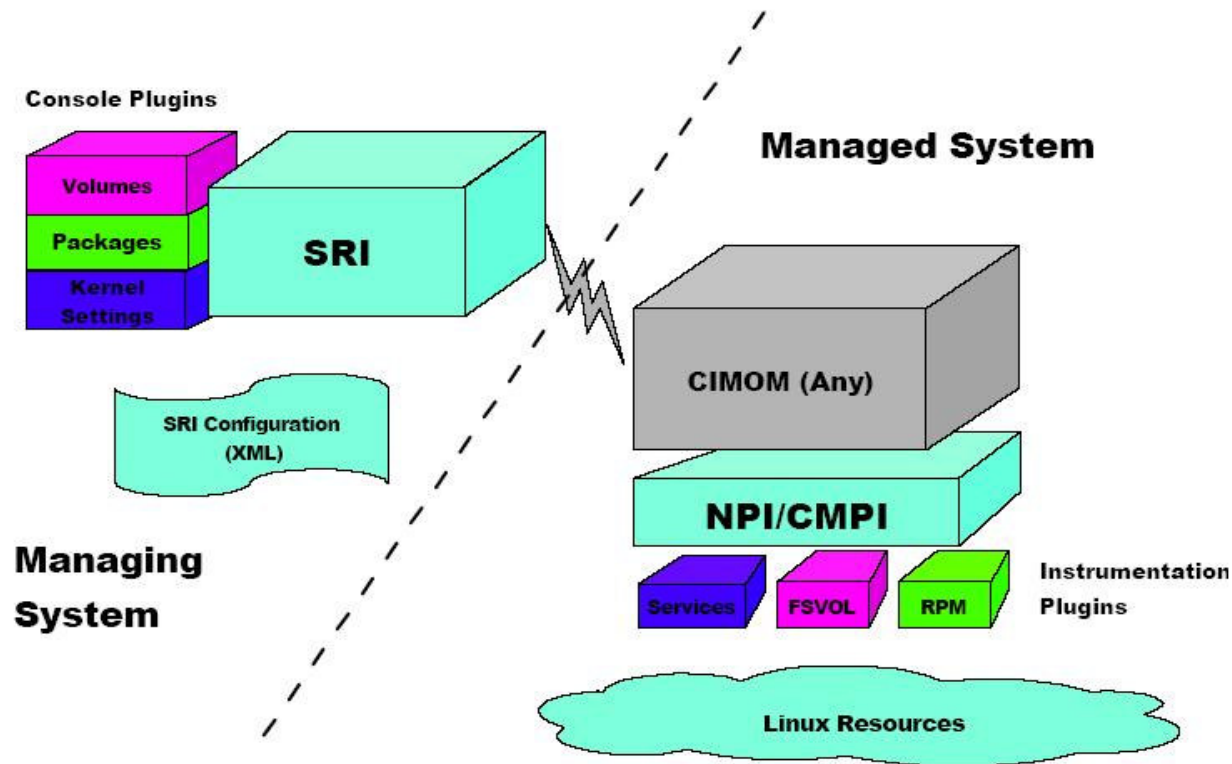


Common Manageability Programming

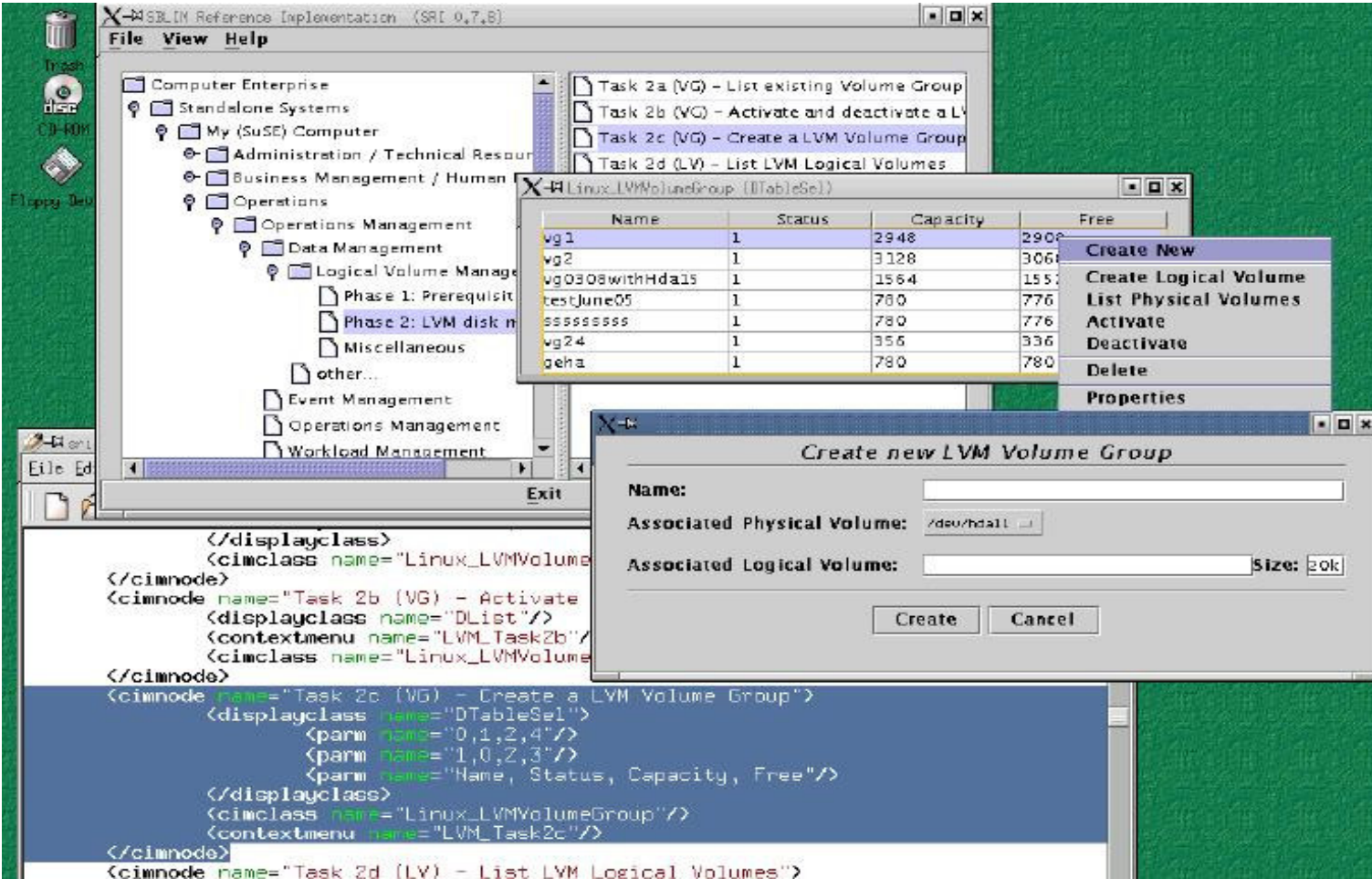
Interface

- defined to write CIMOM independent Management Instrumentation.
- C provider interface standardized by the WBEMsource initiative (www.wbemsource.org).
- 4 types of provider interfaces – Instance, Association, Method, Indication
- 3 major function of Management Instrumentation
 - Supporting the required provider interface
 - mapping raw resource data to CIM data types
 - abstracting the resource access.

SBLIM Components



SRI Example – Volume Management



The screenshot displays the SBLIM Reference Implementation GUI (SRI 0.7.8) with a tree view on the left and a main window showing tasks. A table titled "Linux_LVMVolumeGroup (DTableSel)" is open, showing a list of volume groups. A context menu is visible over the table, and a "Create new LVM Volume Group" dialog box is also present.

Name	Status	Capacity	Free
vg1	1	2948	2900
vg2	1	3128	3061
vg0308withHda15	1	1564	1557
testJune05	1	780	776
sssssssss	1	780	776
vg24	1	356	336
peha	1	780	780

Create new LVM Volume Group

Name:

Associated Physical Volume: /dev/hda11

Associated Logical Volume: Size: 20k

Buttons: Create, Cancel

```

</displayclass>
<cimclass name="Linux_LVMVolumeGroup" />
</cimnode>
<cimnode name="Task 2b (VG) - Activate and deactivate a LVM Volume Group" />
<displayclass name="DList" />
<contextmenu name="LVM_Task2b" />
<cimclass name="Linux_LVMVolumeGroup" />
</cimnode>
<cimnode name="Task 2c (VG) - Create a LVM Volume Group" />
<displayclass name="DTableSel" />
<parm name="0,1,2,4" />
<parm name="1,0,2,3" />
<parm name="Name, Status, Capacity, Free" />
</displayclass>
<cimclass name="Linux_LVMVolumeGroup" />
<contextmenu name="LVM_Task2c" />
</cimnode>
<cimnode name="Task 2d (LV) - List LVM Logical Volumes" />

```



References

- oss.software.ibm.com/developerworks/projects/sblim
- www.wbemsource.org
- www.dmtf.org/standards/cim
- www.dmtf.org/standards/wbem
- www.opengroup.org/snia-cimom
- www.openpegasus.org
- openwbem.sourceforge.net
- wbemservices.sourceforge.net



Credits

- IBM Linux Technology Center's
 - Adrian Schuur
 - Viktor Mihajlovski
 - Heidi Neumann
 - Ulrich Kurz



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Thank you!

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