A Survey of Open Source Solutions In the CIM Environment

A presentation for SVM 07

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Agenda

- Overview of Categories and Exiting Open Source Software
- Overview of Some Open Source Alternatives
- What to look for in choosing Open Source

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Open Source is a Significant Part of CIM Technology Support

OPENWBEM

OpenPegasus
"C++ CIM/WBEM Manageability Services Broker"

SBLIM

- **There are many organizations today creating and contributing open source products for CIM environments**
- **There is a diverse set of available Open Source for complete solutions and components of the WBEM environment**
- **WBEM open source is alive an well**

THE Open GROUP
Making standards work®

‹Openwsman›
ws-management for all

CimNavigator
by DuskFire, Inc.

CIMPLE.org

SBLIM

Novell Linux Instrumentation for Enterprises

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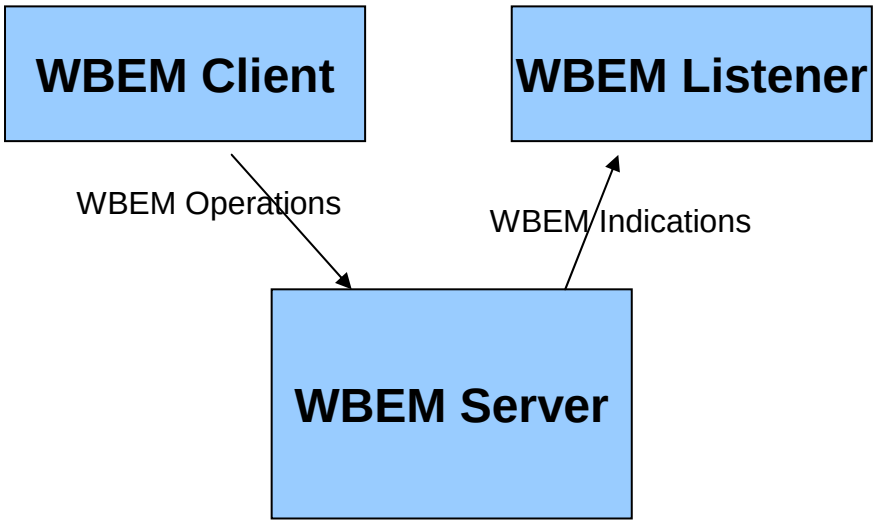
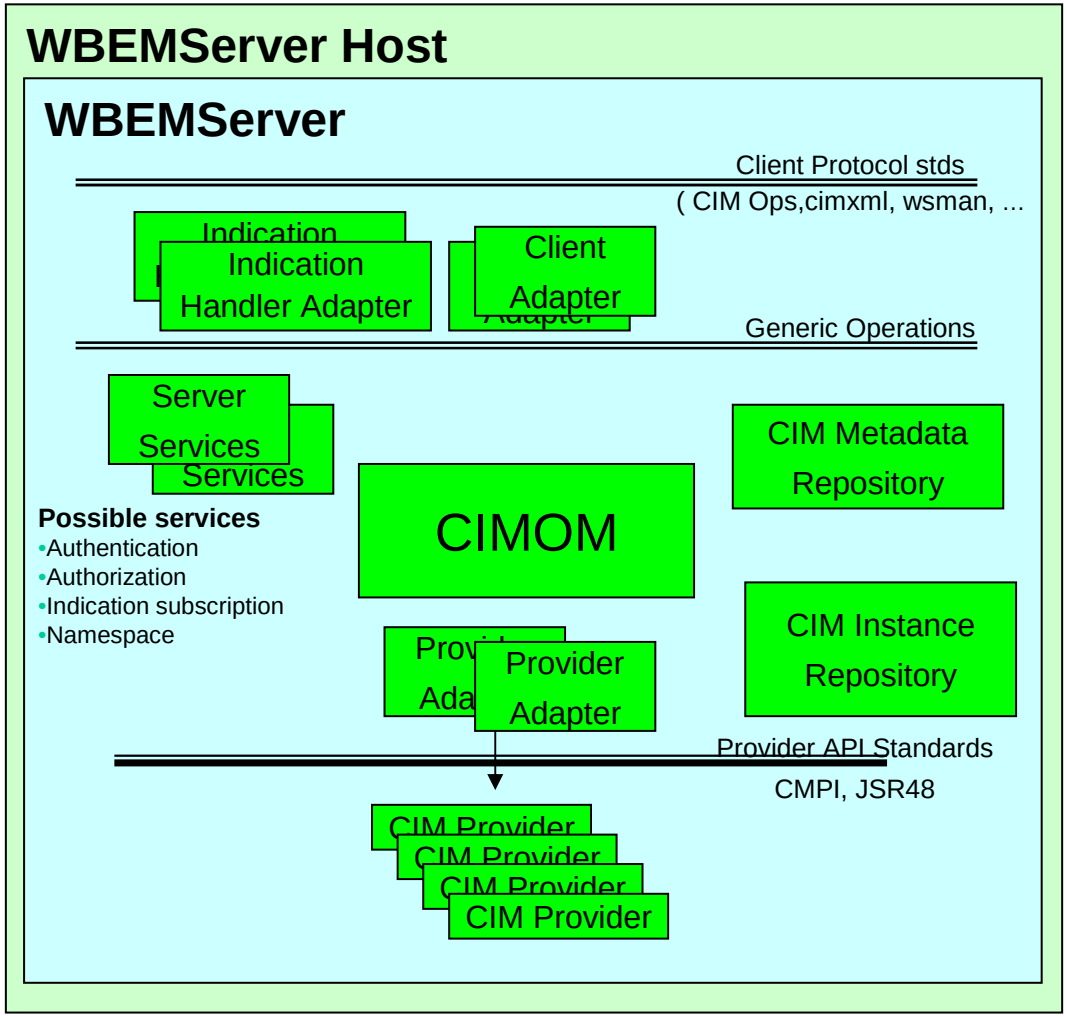
The WBEM Infrastructure





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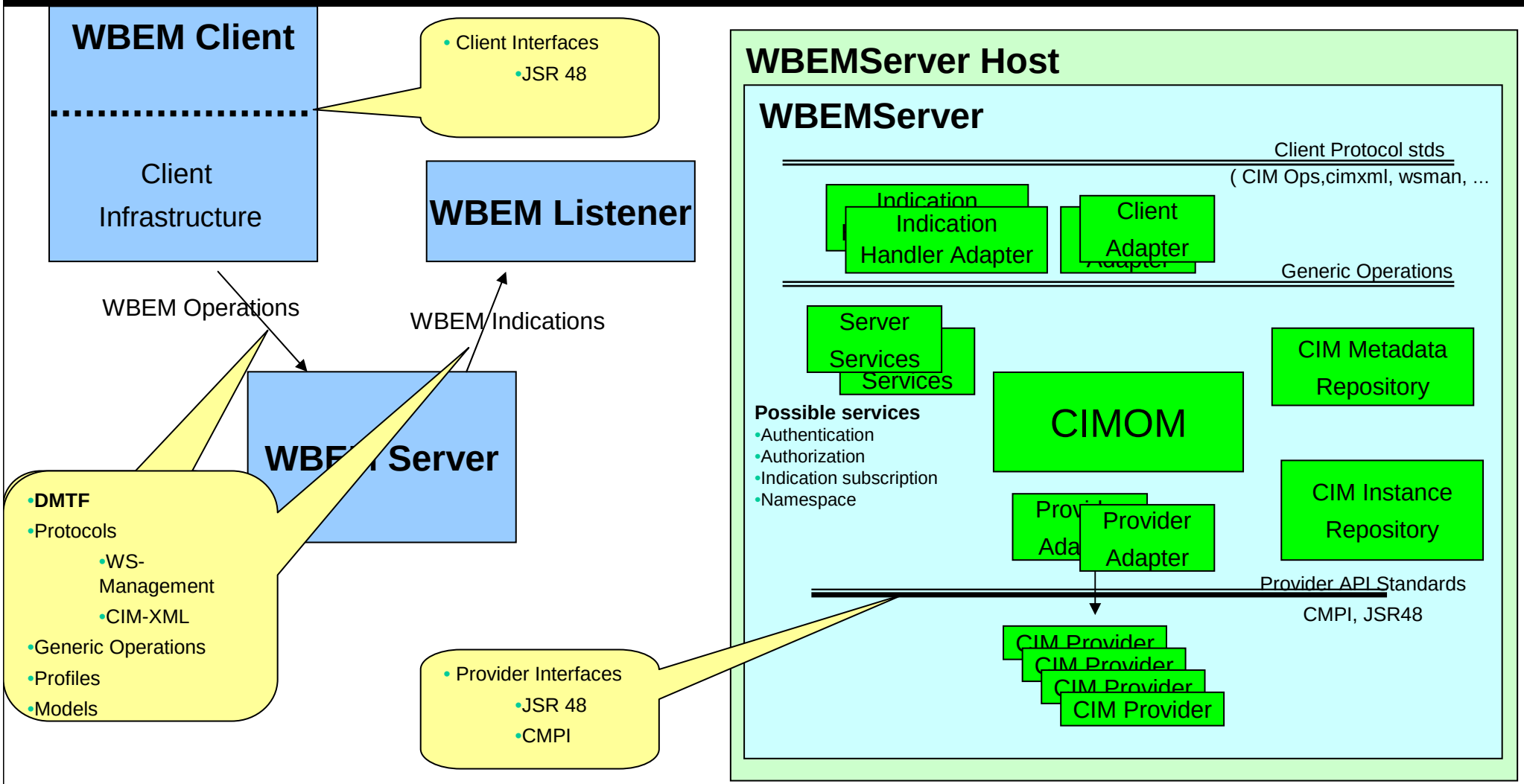
Specifications and Standards



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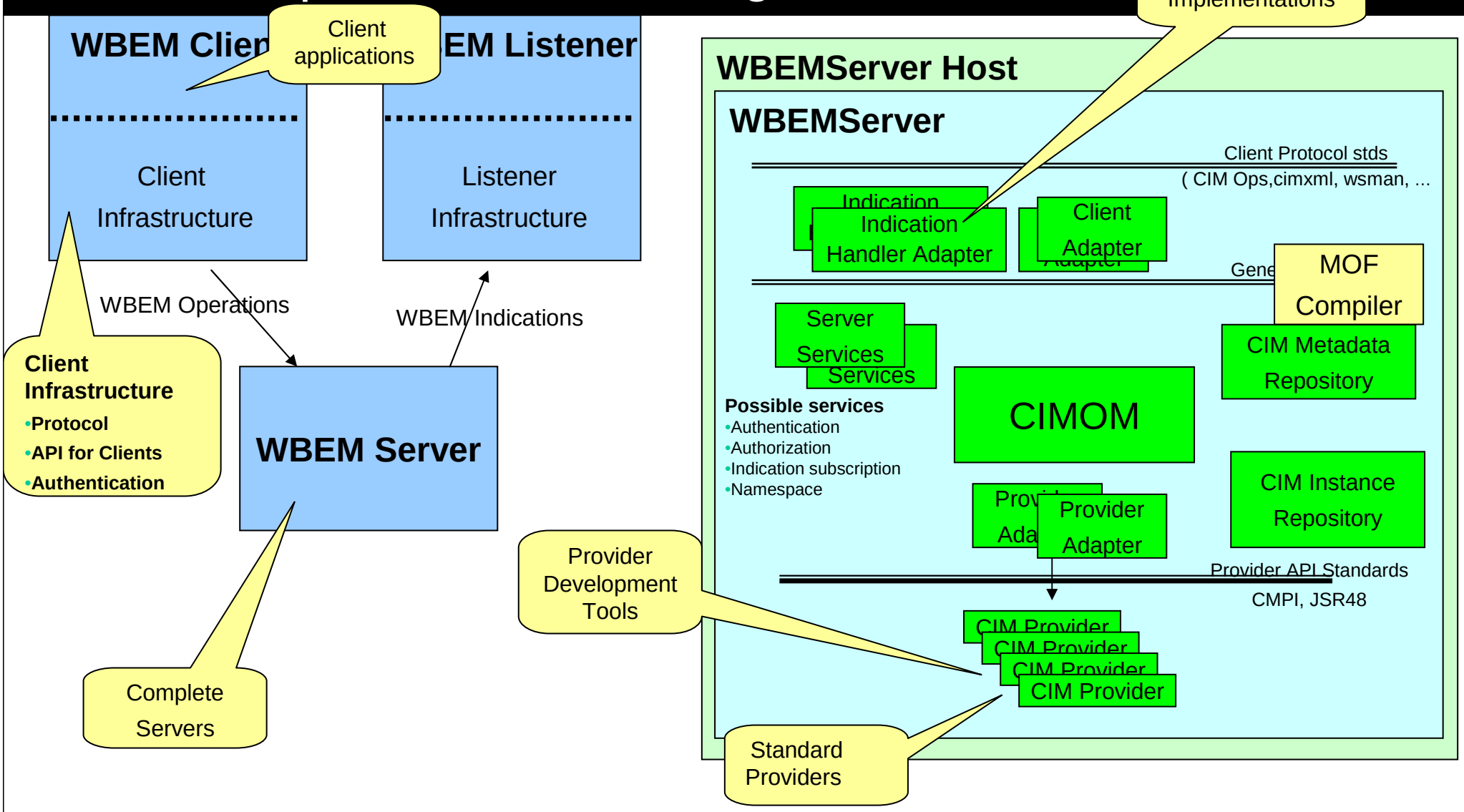
Possible Open Software Categories



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Major Categories of Software

- Integrated CIM/WBEM solutions
  - CIM Server, Client infrastructure, tools, possibly test environment integrated.
- WBEM Servers
  - WBEM Server component with no Client, tools, etc
- WBEM Client/Listener Infrastructure
  - Infrastructure for Client with API (private or standard) for creating Client Application
- WBEM Clients/Listeners
  - Complete clients providing some selected functionality or browsing
- CIM Server Components
  - CIM Providers
  - Protocol Adaption Front Ends
- Tools
  - Runtime Tools
  - Development Tools
  - Test Tools

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Who is Who, Organizations and Companies

- IBM – SBLIM set of Open Source components (clients, broker, providers, tools)
- WBEM Solutions – Java WBEM Services (JWS), CIM Browser
- The Open Group – Open Pegasus, SNIA Java Client, SNIA CIMOM
- Inova Development – CIMPLE
- WBEM Source Initiative – (Dormant for now)
- Openwsman project
- Novell – OpenWBEM, SMASH, CLP components
- SUN – WiseMan Java WS-Management Implementation
- Many Others . . .

NOTE: Neither DMTF or SNIA directly distribute open source components today. They do maintain internal partial lists of available solutions

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What Open Source Software is Available

- **Integrated CIM/WBEM Solutions**
  - Java WBEM Server
  - OpenPegasus
  - OpenWBEM
  - SNIA CIMOM (obsolete)
- **WBEM Servers**
  - SBLIM Small Footprint CIM Broker
- **WBEM Clients**
  - Kim-browser
  - WBEM Server Java Browser
  - CIMNavigator
  - SNIA Browser
- **WBEM Client Infrastructures**
  - CIM-XML
    - SBLIM Java Client
    - PyWBEM
    - RubyWbem
    - Pegasus SNIA Client
  - WS-Management
    - Openwsman
    - WiseMan Java WS-Management
  - Smash CLP
    - Novell OMCSmash
- **CIM Server Components**
  - Providers
    - SBLIM CMPI Provider Set
    - Novell Linux Driver Project
    - Novelllife – Linux Instrumentation for Enterprise Open/WBEM providers
  - Profile Implementations
    - None todayu
  - **Tools**
    - CIMPLE Provider Development Environment
    - ECUTE – support for multiple phases of development with UML interaction
    - Cisco Model Wizard
- **Specific CIM/WBEM Components**
  - WS-Management
    - Openwsman
    - WiseMan – Java Implementaiton of WS-Management
  - SMASH-CLP
    - Novell OMCSmash
  - WMI interface
    - Pegasus WMI Mapper

This list is based on the author's knowledge and is probably incomplete. Suggestions for more entries are welcome

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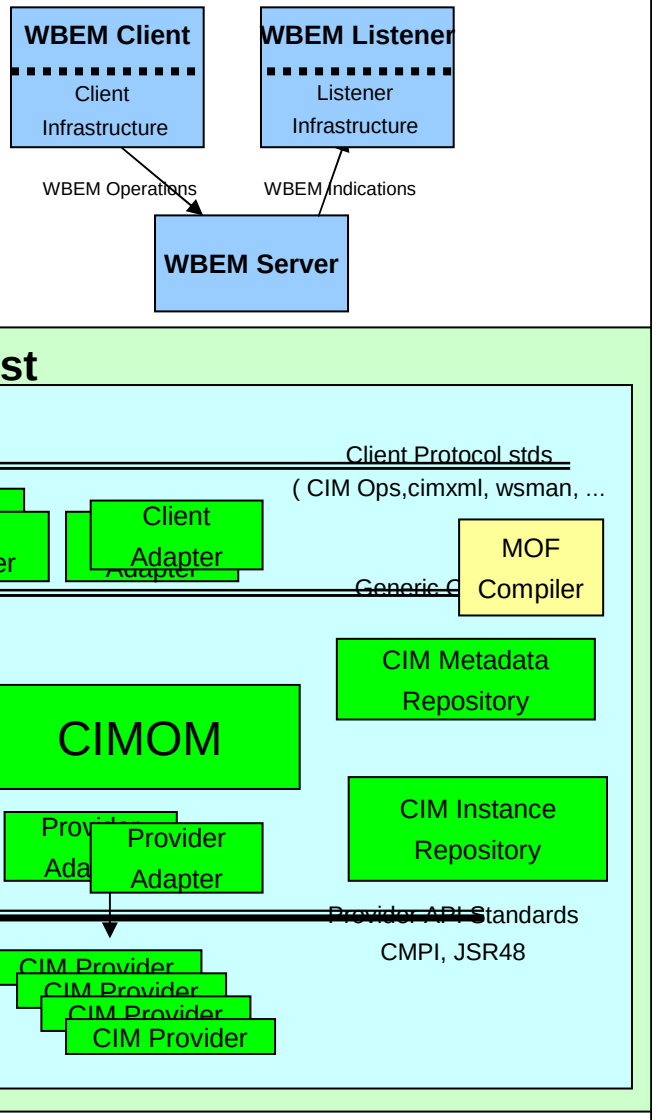
Integrated CIM Environments

- General Characteristics
  - Include servers, clients, listeners
  - Include support tools (compilers
  - Include sample or set of providers
- Typically integrated and tested together
- Typically growing and changing
  - DMTF specs changing and growing
- Include distribution installation tools
- Source and binaries available
- Moving towards availability integrated into OS environments



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The CIM Servers (OpenPegasus)

- All major components
  - (server, client/listener infrastructure, compilers, some providers, test suite, CQL, WQL, Indication Support, security
- Project
  - Community project under auspices of The Open Group
  - Major contributors, HP, IBM, Symantec, EMC
  - Project Lead– The Open Group
- Regular Releases
  - ~ 9 month cycle
- Availability
  - Source (cvs, rpms, tar balls)
  - Binaries for Linux (rpms, RedHat and SUSE distributions)
- Major users
  - HP, IBM, Symantec, EMC
  - Multiple other SNIA SMIs server implementers.
- Platform Target
  - Initially broad set of OS/Platforms
  - Now adding embedded system support
- Platforms Supported
  - Linux, Unix, Mac, Windows, VMS, ZOS, VxWorks (planned)
- License
  - MIT License
- Provider Types
  - Pegasus C++
  - CMPI
  - Java (SNIA Provider Interface today)
- Development Language
  - C++
- Client API Language
  - C++
- Client Protocols
  - CIM/;XML
  - WS-Management in process

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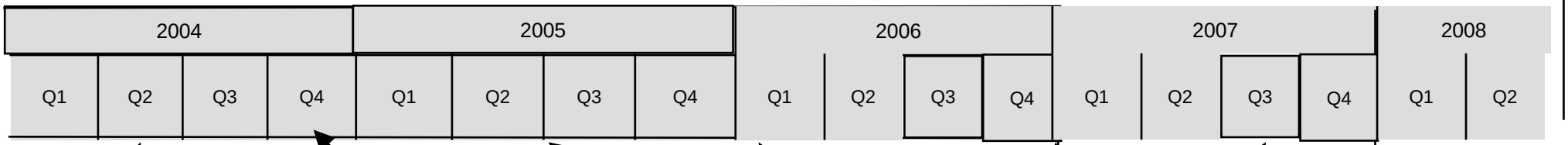
OpenPegasus Release Roadmap



OpenPegasus 2.3.2
PEP
Process Indications
Significant Defect Fixes
Security Enhancements
Configuration Enhancements

Experimental
Linux RPMs (SDK, Runtime)
CMPI Providers
Globalization Support
C++ Listener
Pluggable Provider Manager
SLP Discovery
Association Providers

OpenPegasus 2.4
PEP 97
Linux RPMs
Pluggable Provider Managers
CIM 2.8 Schema
Association Providers
CMPI Providers

Experimental
Out-of-Process Providers
Globalization Support
Certificate-based Authentication
HTTP Chunking (Client Side)
CIM Server Statistic Monitoring
SLP Discovery
Binary Repository
Remote CMPI Providers
Java Providers and Clients

OpenPegasus 2.5
PEP 180
Out-of-Process Providers
Globalization Support
Certificate-based Authentication
HTTP Chunking (Client Side)
SLP Discovery
CIM Server Statistic Monitoring

Experimental
Initial CQL Support
HTTP Chunking (Server Side)
Binary Repository
Remote CMPI Providers
Java Providers
Initial Lifecycle Indication Support
Embedded Object Support

OpenPegasus 2.8
- SPL – Experimental
- cimxml pull operations
- Improved Embedding

OpenPegasus 2.~~8~~
PEP 298
ExtendCIM Error Support
Privilege Separation
Remote CMPI providers
Audit Tools, IPV6

OpenPegasus 2.6
PEP 218
CIM_Error Support
Embedded Instance Support
JMPI Java Providers
SMIs Server Profile

Experimental
Embedded Instance Support

OpenPegasus 2.5.1
PEP 239
Binary Repository
Performance Improvement

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The CIM Servers (OpenWBEM)

- All major components
  - server, client infrastructure, compilers, some providers, test suite, WQL, Indication Support, security
  - Missing CQL today
- Project
  - Project Lead, Novell
  - Major contributors, Novell
- Regular Releases
  - Regular Releases
- Availability
  - Source (cvs, rpms, tar balls)
  - Binaries for Linux (rpms, SUSE distributions)
- Major users
  - Novell
  - Multiple SNIA SMIs server implementers
- Implementation target
  - Initially Linux Systems
- Platforms Supported
  - Linux, Netware, Solaris, HP-UX, Mac
- Status Today
  - Continuing Development
  - Generally a complete solution except for CQL today.
- License
  - BSD Open Source License
- Provider Types
  - OpenWBEM C++
  - CMPI
  - Perl
- Development Language
  - C++
- Client API Language
  - C++
- Client Protocols
  - CIM-XML
  - WS-Management through openwsman

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The CIM Servers (Java WBEM Server)

- All major components
  - server, client infrastructure, compiler, some providers, test suite, CQL, WQL, indication support
  - Project Lead – WBEMSolutions
  - Major contributors WBEMSolutions
- Project
  - Originally Sun project. Now largely WBEMSolutions
- Releases
  - As required by current users
- Availability
  - Java Source
- Major users
  - Many Early Adapters of CIM Infrastructure
  - Multiple SNIA SMIs server implementers.
- Platforms Supported
  - Java
- Status Today
  - Widely Used, particularly in SNIA community
  - Competing with WBEM Solutions proprietary products so future uncertain
- License
  - SISSL (Sun Industry Standards Source License) V 1.2
- Provider Types
  - JSR 48 Java
- Development Language
  - Java
- Client API Language
  - Java – JSR 48 client API
- Client Protocols
  - CIM/-XML

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SBLIM Small Footprint CIM Broker (sfcb)

- CIM Server. SBLIM project includes other components
  - server, some providers, test suite, CQL, WQL, indication support
- Project
  - Project Lead – IBM SBLIM Project
  - Major contributors: IBM, Intel
  - Regular Releases
- Availability
  - Source (cvs, rpms, tar balls)
- Major users
  - Unsure Today
- Platforms Supported
  - Linux
- Status Today
  - Widely Used
  - Competing with WBEM Solutions proprietary products so future uncertain
- License
- Provider Types
  - JSR 48 Java
- Development Language
  - C
- Client Protocols
  - CIM/;XML

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CIM Client Infrastructure Projects

- CIM/XML
  - OpenPegasus, OpenWBEM, JWS
    - Clients and listeners
  - SBLIM Java Client
    - Complete client infrastructure
  - pyWBEM
    - Client Infrastructure written in Python
    - Python Interface to the client app
  - RubyWBEM
    - Clone of pyWBEM in Ruby
  - Pegasus SNIA Client
    - Client Portion of the original SNIA CIM Server work.
    - Maintained by OpenPegasus Project
- WS-Management
  - Openwsmancli
  - Wiseman
  - OpenPegasus (planned)

Client Infrastructure includes
- Client side of protocol
- Support for functions like authentication
- API for provider application interface

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WS-Management Open Source Projects

- WS-Management
  - Implementation of
    - Server Side WS-Management protocols
    - Adapters for multiple CIM Servers
    - Clients
    - Test environment
  - Developed in C
  - Client bindings for C and Ruby client apps
- WiseMan Java WS-Management
  - Java based implementation of WS-Management Protocols
  - Includes
    - Client
    - Server code for translation between ws-management and DOM or Jaxb documents

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WBEM Support Tools

- Provider Development Tools
  - CIMPLE Provider Development Environment
    - Creates provider framework directly from MOF
    - Creates providers for multiple environments (C++, CMPI)
      - Interface OpenPegasus, OpenWBEM today
    - Creates providers with same resource utilization as best techniques as manual creation
    - License – MIT Open Source License
  - OpenWBEM Project Provider Writer (codegen
    - Status uncertain – Only a single release (v 0.1.0) 2003
    - Available from OpenWBEM Sourceforge web site
  - SBLIM ECUTE
    - See below
- Test Tools
  - openwsman test tools – Specific to ws-management
- UML – MOF Support
  - Ecute
    - Eclipse based tool for mapping MOF into UML development environment.
    - Includes mapping and provider development components.
  - ModelWizard (Cisco)
    - Eclipse based tool for information modeling using UML2 – Not CIM Specific

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CIM Server Components

- Providers
  - SBLIM Instrumentation for Linux
    - Significant number of well designed system level providers for Linux
    - CMPI interface
    - Regular updates occurring.
    - Distributed as part of WBEM solutions by some Linux distributions now.

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Who Uses Open Source CIM Software

- Infrastructure users
  - Ex. Major part of SNIA SMIs solutions are based on one of the open source infrastructures (JWS, OpenWBEM, OpenPegasus)
- Academic Projects
  - We have no idea who other than questions on the discussion lists.
- Major suppliers for OS platforms
  - Ex. HP, IBM
- Linux Distributions
  - Both RedHat and SUSE distribute at least one Open Source CIM Server

One issue with open source is that you never really know who is using your product unless they buy support or contribute back. Most users never communicate back.

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Criteria for Selecting Open Source

- Product match to your requirements.
- Quality of the product
  - Is it really usable
  - Is it modifiable for you needs if you need to
- Currency of the product
  - Current with the activities of the standards groups?
  - Remember, CIM/WBEM is still growing
- Relation to the specifications
  - Comply with the specifications
- Expected future life of the project producing the product
  - DMTF is changing and growing. Will this support future changes?
  - Is there a working project team?
- Capability of your team
  - Work with distributed support, minimal documentation
  - Use the source itself as documentation
- Level of activity of the project
  - Multiple releases, regular updates, bug maintenance
- Support Availability
  - Discussion groups, bugs and fixes, new versions, paid support
- Breadth of usage
  - Who is using this product
  - Often difficult to obtain information on users for open source
- Documentation
  - We are all probably universally not very good with this activity
- Distribution License
  - Is the license sufficiently liberal for your usage.
- Ability to impact the project
  - Can you get your requirements back into the product?
- Resource issues (memory, disk, etc.)
- Development & API Language choices
  - Match product to your language needs

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Pros and Cons of Using Open Source

- Pros
  - Understand the product before making commitments
  - Quality generally good
  - Wide variety of solutions available today
  - Many of the open source products producers work closely with the standards groups.
  - Typically less costly but be careful since internal development costs can surprise you if the implementation needs work
- Cons
  - Documentation often limited
  - Levels of support indeterminate
  - Often difficult to determine the expected future of the product/project
  - Products often adapt to the whims of the developers, not the user community
  - Possibly requires higher skills from user

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How to Learn More about Open Source Solutions

- Review the available information/documentation on the product(s) and project(s)
  - Most open source is distributed and supported via the web
- Look at the source code
- Test and play with the product
  - Often the reason they are open source is to provide this capability
- Join Discussion forums and groups
- Talk to other users
- Join the project(s)
- Attend the DMTF Management Developers Conference
  - Many open source projects use that venue to provide updates and information

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Conclusions

- There is a significant set of Open Source implementations of both integrated and components of the WBEM infrastructure available today
- Today probably all implementations are incomplete
- There is no single source that provides all possible components
- As with the specifications, the implementations are changing and growing rapidly
- The reasons for these implementations existing vary greatly
- The quality varies greatly
- Today you can use many of these implementations for production solutions
  - Only you can chose which open source products to use
  - You need to consider many factors in chosing
- Expect at least some integration/merge of these diverse implementations
  - Much less fun to maintain something than to create it
  - The funds and even the commitment often disappear after initial availability
- The existence of CIM/WBEM components in the Linux distributions is a major step for Open Source implementations. That will strengthen

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Selected Web Site References

- JWS http://wbemservices.sourceforge.net/
- OpenPegasus http://www.openpegasus.org
- OpenWBEM http://openwbem.org/
- SBLIM http://sblim.wiki.sourceforge.net/
  - ECUTE, SFCB, SBLIM Providers, etc.
- **CIMPLE –** http:/www.cimple.org
- **pyWBEM** - http://pywbem.sourceforge.net
- **RubyWBEM** - http://rubyforge.org/projects/rubywbem
- **CIMNavigator** - http://cimnavigator.com
- Novell OMC - http://developer.novell.com/wiki/index.php
- CIMWizard - http://sourceforge.net/projects/modelwizard
- OpenWsManagment http://www.openwsman.org/
- **WiseMan** https://wiseman.dev.java.net/

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