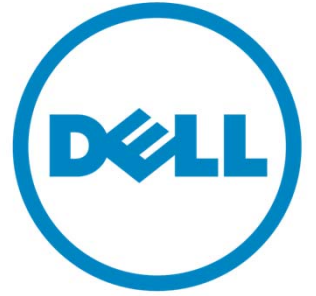


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# Where to Find WS-Man/CIM Info

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# Goals

- Intro to CIM
  - Overview here, let me know where to go deeper
- Where to get docs for reference, and which docs



# WS-Man/CIM? CIM Is the Main Problem

- WS-Man is just a protocol, a method of sending information over a wire
- The information is structured according to DMTF CIM, which is very complex
  - Many classes, many profiles, many small specs to fit together
- 90% of the problems I've heard are CIM-related, not just WS-Man related



# Where to Get Most Documents

- [www.dmtf.org](http://www.dmtf.org)
  - Standards -> Published Documents for profiles, XSDs
  - Standards -> CIM for MOFs and MOF Docs
- [www.delltechcenter.com](http://www.delltechcenter.com)
  - OpenManage Systems Management -> DCIM - Dell CIM Extensions for Dell profiles and Dell MOFs that have been released to the public

# CIM MOF Files

- Get Experimental and Final MOF file collections
  - cim\_schema\_2.26.0Experimental-MOFs.zip
  - cim\_schema\_2.26.0Final-MOFs.zip
- Get schema doc files, HTML docs that describe classes and properties
  - cim\_schema\_2.26.0Experimental-Doc.zip



# MOF Docs in HTML Form

- Collection of all MOFs in a processed HTML format
  - Parent class in inheritance hierarchy
  - Known subclasses
  - Local property descriptions and qualifiers
  - Where inherited properties come from
  - Shows methods, local and inherited
- Hyperlinked to related classes, properties, methods



# CIM Is an Object-Oriented Data Model

- Pretty vanilla OO model, single inheritance
- Parent-child class hierarchy, multiple children specialize the class of the parent
- Child class inherits from parent class
  - Properties, methods, class qualifiers
  - Child class can override some property qualifiers from parent
- Often need to know where a property or method is actually defined

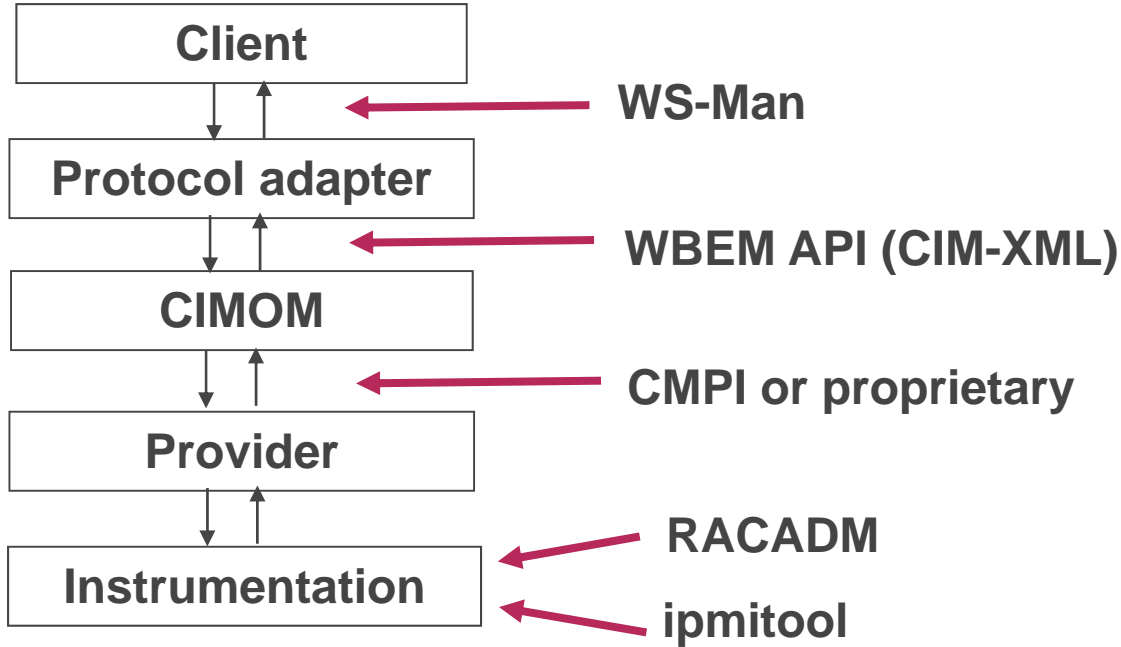
# Architecture of a CIM Server

- Strict layers that speak only to adjacent layers above or below
  - Client: WinRM client, OpenWSMan CLI, DMC
  - Protocol adapter: WinRM agent, OpenWSMan agent, WBEM (CIM-XML)
  - CIMOM: WMI (Windows), SFCB (embedded Linux), Pegasus (SuSE Linux)
  - Provider(s): implementing various DMTF and DCIM profiles
  - Instrumentation: drivers or other low-level





# Architecture Picture



# Document Hierarchy

- Architecture: Very general principles, for developers only
  - MOF: Formal definition of class:
    - Properties, datatypes, methods (functions)
  - Profile: Interoperability contract between service and client, what must be implemented at a minimum
    - Classes, properties, values, methods, behavior
  - Initiative: DASH, SMASH, "wrapper spec" above others
  - DCIM profiles: Dell-specific implementations
- 



# How to Enumerate and Get Instances

- Generally, enumerate the CIM parent class to find the DCIM class instances
- View classes are an exception: enumerate the DCIM\_XxxView directly
- Enumerate with classname only
  - Retrieves child classes, too
  - Can ask for pointers (EPRs) or instances, good for small sets
- Get with classname and all keys



# Where Customer Navigation Starts

- "PRP" Profile Registration Profile, DSP1033
- "interop" namespace
  - Usually called "root/interop"
- Contains a list of all profiles implemented
  - Instances of class CIM\_RegisteredProfile, for all versions implemented
  - Associated with instances in other namespaces of, e.g., CIM\_ComputerSystem, devices, software instances, etc., using association class CIM\_ElementConformsToProfile ("ECTP")



# More Later

- Working on list
- Open to all suggestions: SEND EMAIL

