Standard-based Systems Management Solution for KVM

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- Introduction to CIM and WBEM
- Existing WBEM Infrastructure
- CIM-Enablement for KVM

Systems Management (1/3)

- Tasks
  - Administration
    - List
    - Installation
    - Configuration
  - Operation
    - Monitoring
    - Problem Determination
- Problems
  - Heterogeneity in
    - Hardware
    - Operating Systems and Middleware
    - Applications
  - Volume of
    - Monitoring Data

Systems Management (2/3)

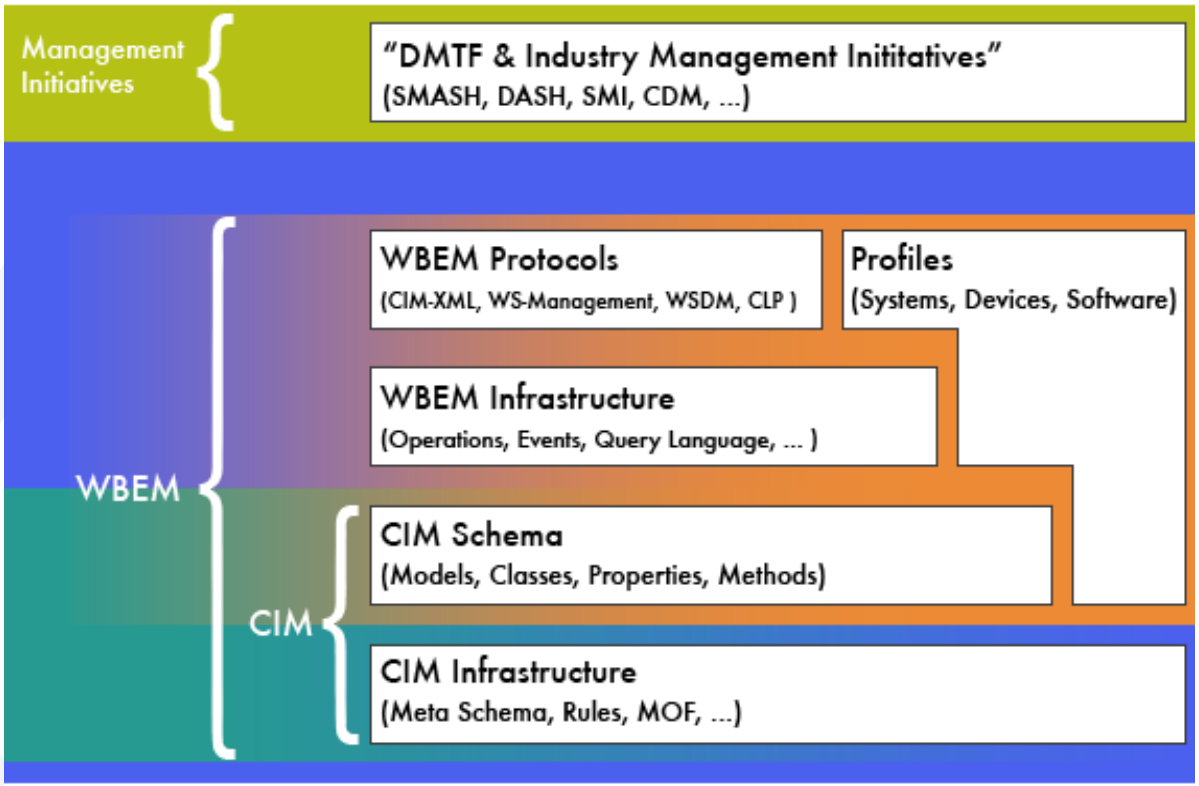
- Solutions
  - Problem Oriented Standards (SNMP)
    - Interoperable
    - Only partial solutions
    - Can be extended beyond original scope – but with loss of interoperability
  - Proprietary Systems Management Suites
    - End-To-End
    - Missing Interoperability

Systems Management (3/3)

- Interoperability has to deal with
  - Unclear Semantics on
    - various problem domains / perspectives
    - different technology / encoding / protocol
- Interoperability needs
  - Common Standards for
    - Modeling
    - Protocol
    - Problem Domains

Distributed Management Task Force

- Industry Consortium to
  - Develop Management Standards
  - Promote Interoperability for Enterprise & Internet Environments



Common Information Model (1/3)

- Foundation of DMTF technologies with focus on
  - Concepts
  - Modeling
- Consists of
  - CIM Infrastructure
    - describes the object oriented modeling and composition features
  - CIM Schema
    - delivers semantically rich, object-oriented model descriptions for all managed elements

Common Information Model (2/3)

- CIM Infrastructure consists of
  - Meta Schema
    - Schema, Classes, Associations
    - Instances, Properties, Methods
    - Qualifiers (Meta-Attributes)
  - Modeling Features
    - Inheritance, Overriding of Properties and Methods
    - Association
    - Logical Grouping of Classes via Schema
  - Details for Integration with other Management Tools
    - Encoding to MOF, UML, XML

Common Information Model (3/3)

- CIM Schema consists of
  - Core Schema
    - contains the essential classes for Systems Management (Core)
  - Common Schema
    - contains the most important classes for various disciplines (System, Device, Network, User, Application, Database, ...)
  - Example

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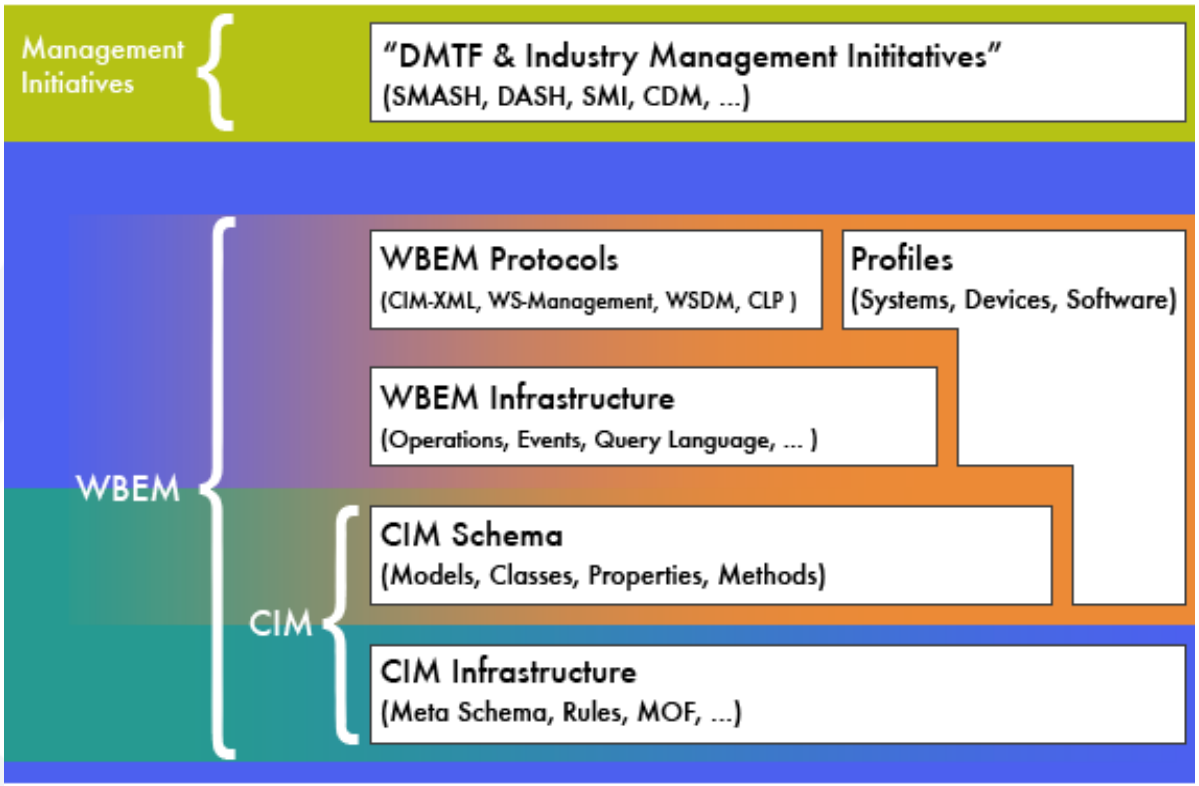
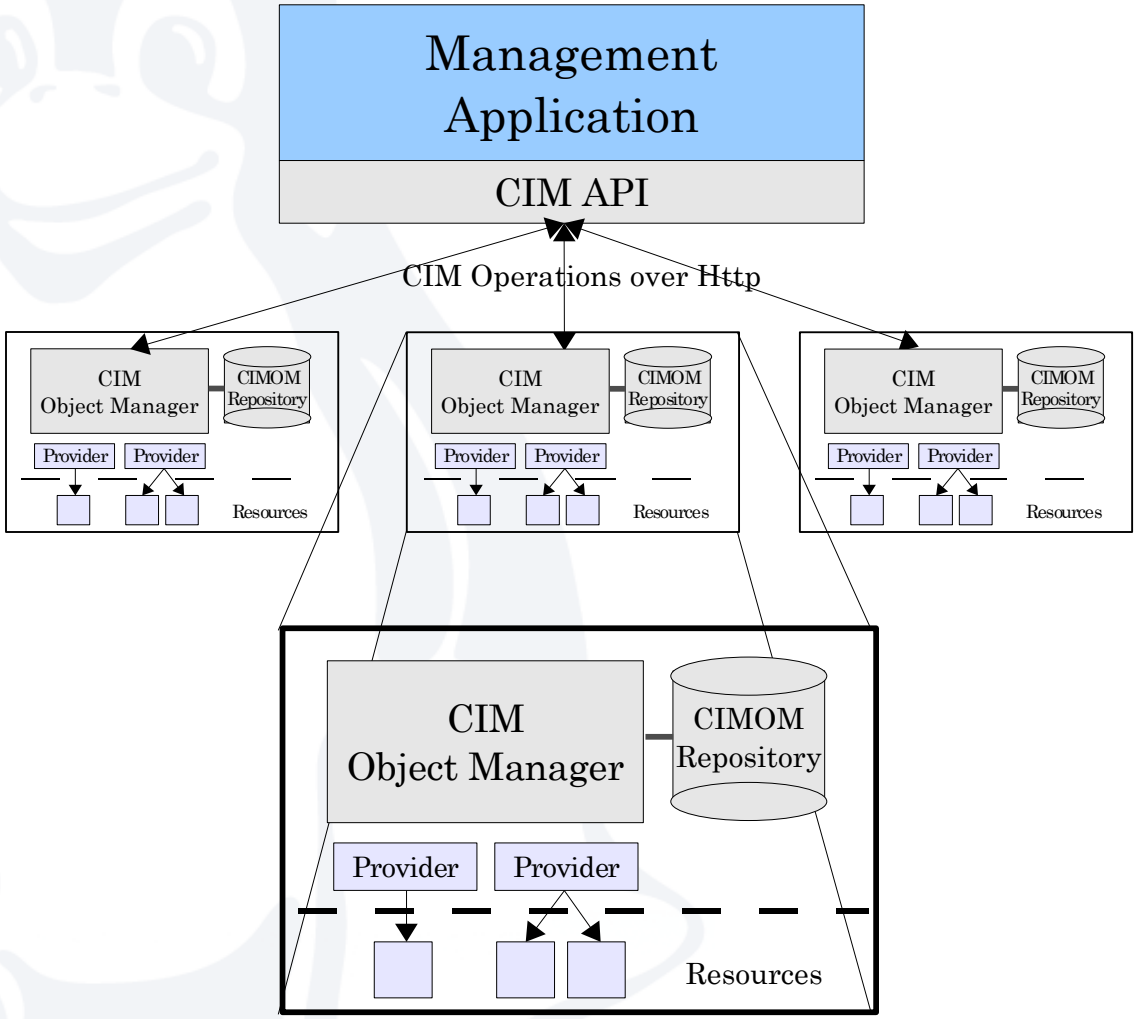


Web Based Enterprise Management

- WBEM as Standard for Interoperable Systems Management
- Defines Implementation rules for CIM-based Systems Management
  - XML Encoding of CIM Objects
  - Semantical Definition of CIM Operations for Schema and Object Manipulation
  - Protocol “CIM Operations over Http”

WBEM Architecture

- three-tiered
  - Management Apps aka CIM Client
  - CIM Object Manager aka CIM Server
  - Providers for Resource Access



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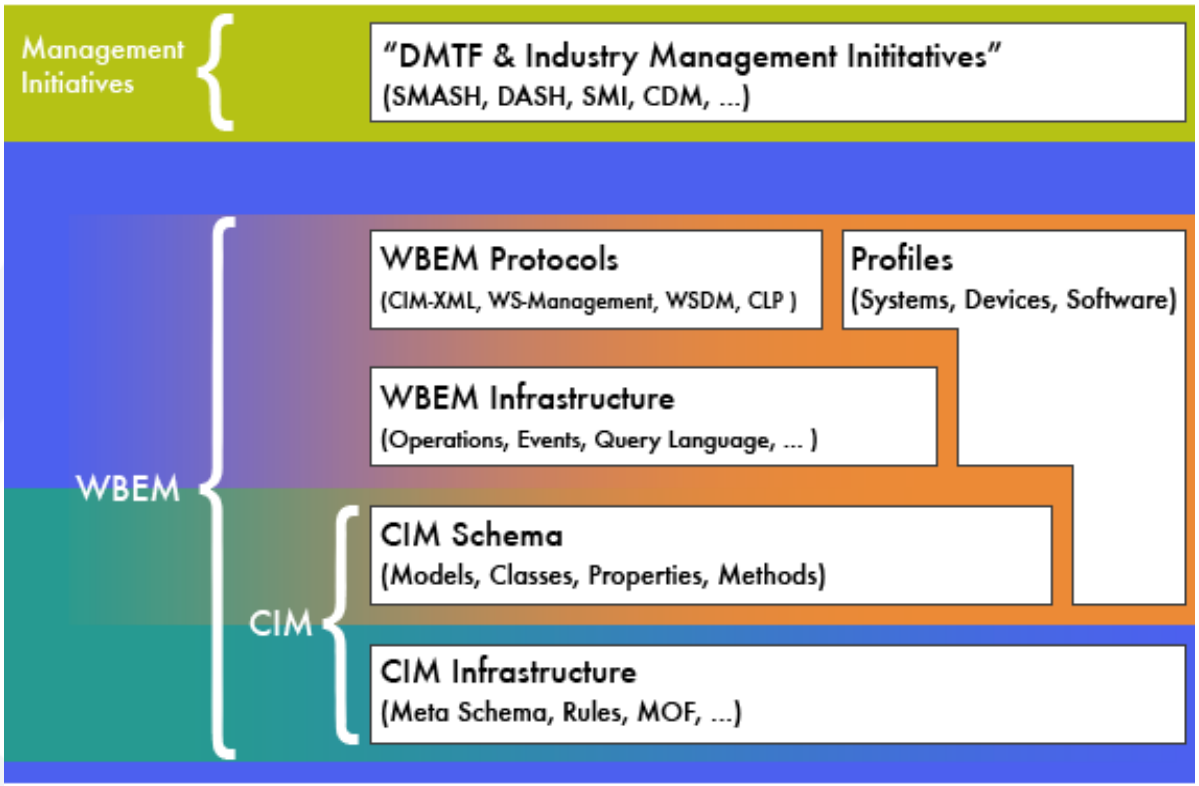


Profiles

- Profiles
  - define the CIM model and associated behavior to address specific management domains
  - provide a unified way of describing management domains in CIM
    - Interoperability
    - Ease of use
  - System Virtualization Profile

WBEM Solutions

- Non Open Source
  - Microsoft's WMI
  - Sun's WBEM Services for Solaris

Open Source WBEM Infrastructure (1/3)

- CIMOMs
  - Small Footprint CIM Broker (sfcb)
    - C
  - OpenPegasus (RHEL 4 ++)
    - C++
  - OpenWBEM (SLES 9 ++)
    - C++
  - WBEMServices
    - Java

Open Source WBEM Infrastructure (2/3)

- CIM Clients ordered by programming language
  - C (sfcc)
  - C++ (OpenPegasus, OpenWBEM)
  - Java (WBEM Services)
  - Python (PyWBEM)
- WBEM Applications
  - WBEM SMT

Open Source WBEM Infrastructure (3/3)

- CIM Providers
  - Novell Providers (SLES)
    - base
    - SMASH Profile
  - SBLIM Providers (RHEL, SLES)
    - base, network, file system & volume, nfsv3/4, syslog, sysfs
    - Monitoring Infrastructure (gatherer, plugins for data gathering)
  - their number is increasing constantly ...

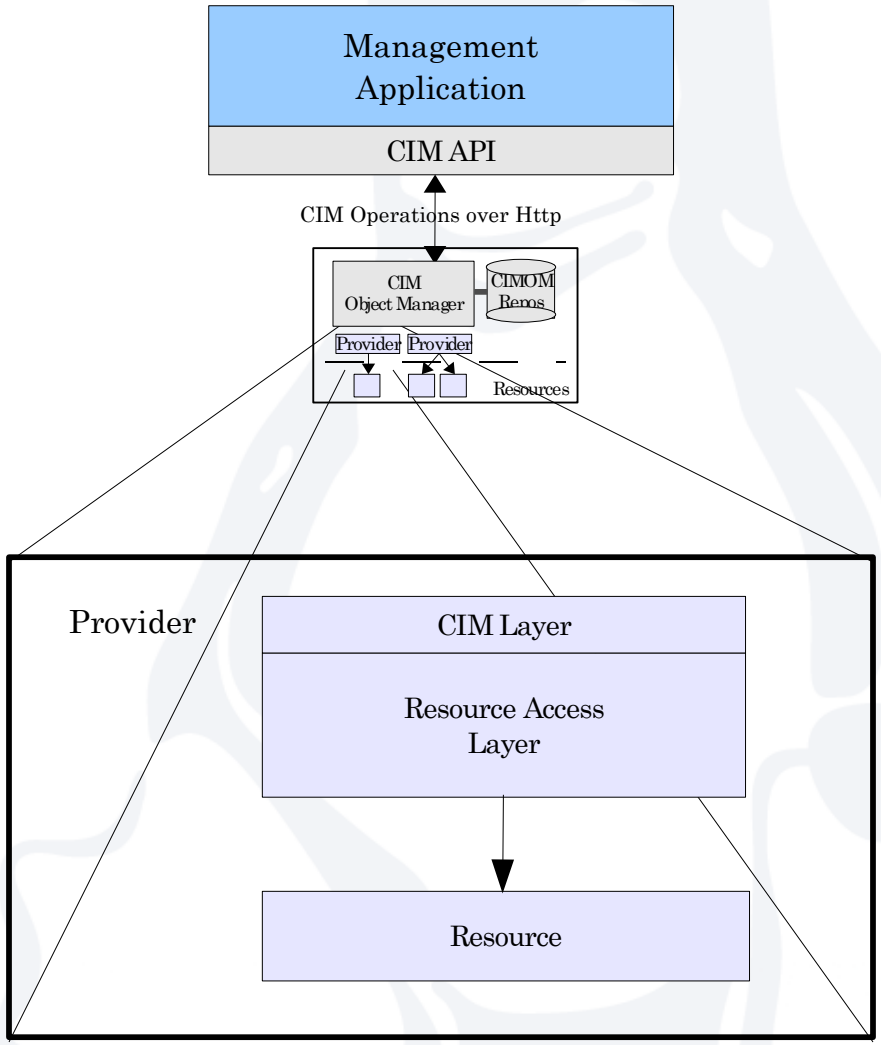
CIM-Enablement for KVM (1/2)

- KVM benefits of CIM's / WBEM's
  - Industry Acceptance
  - Proven Infrastructure / Development Environments
    - CIM Clients
    - CIMOMs
    - Test Suites
  - Common Virtualization Model
    - Part of latest CIM Schema v2.16 (coming soon)
- KVM delivers a standardized, model-based, interoperable Systems Management Interface

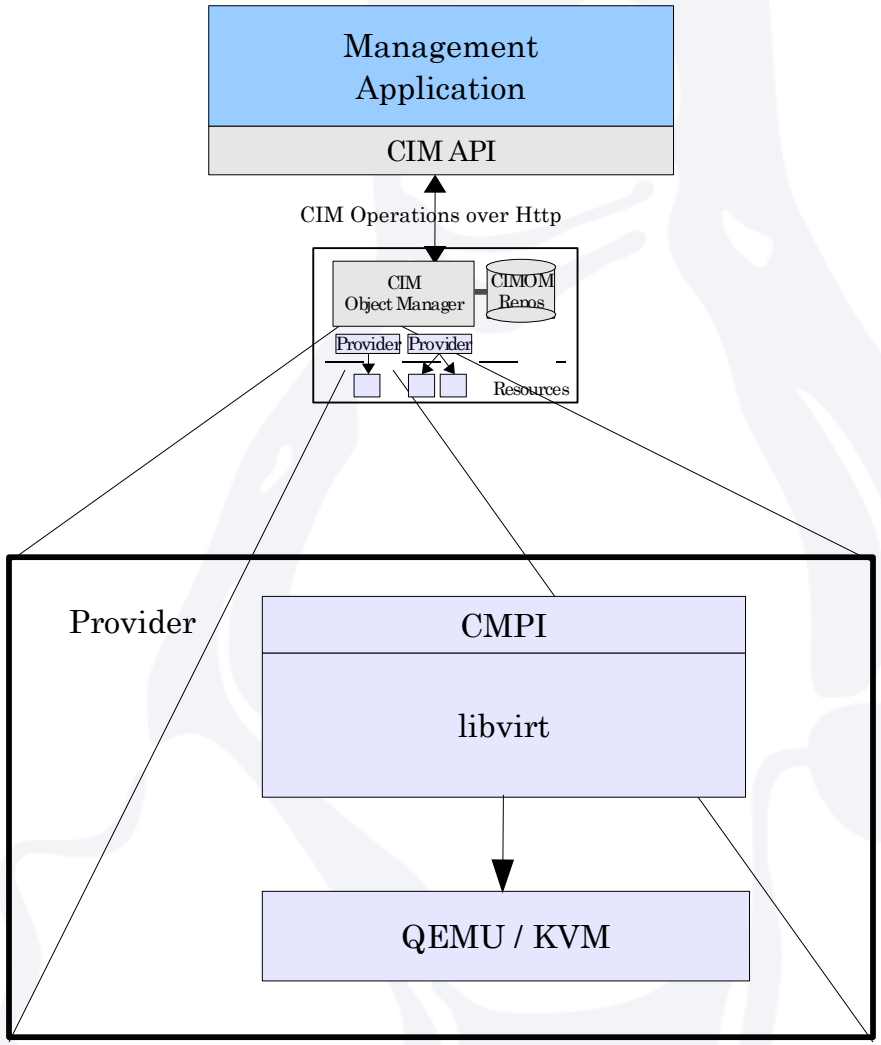
CIM-Enablement for KVM (2/2)

- What needs to be done ?
  - Implementation of the Virtualization Profile(s) for KVM (writing providers)
  - Adoption of KVM providers into RHEL and SLES
  - CIM Application Extensions to make use of the KVM providers

Provider Architecture



KVM Provider Architecture



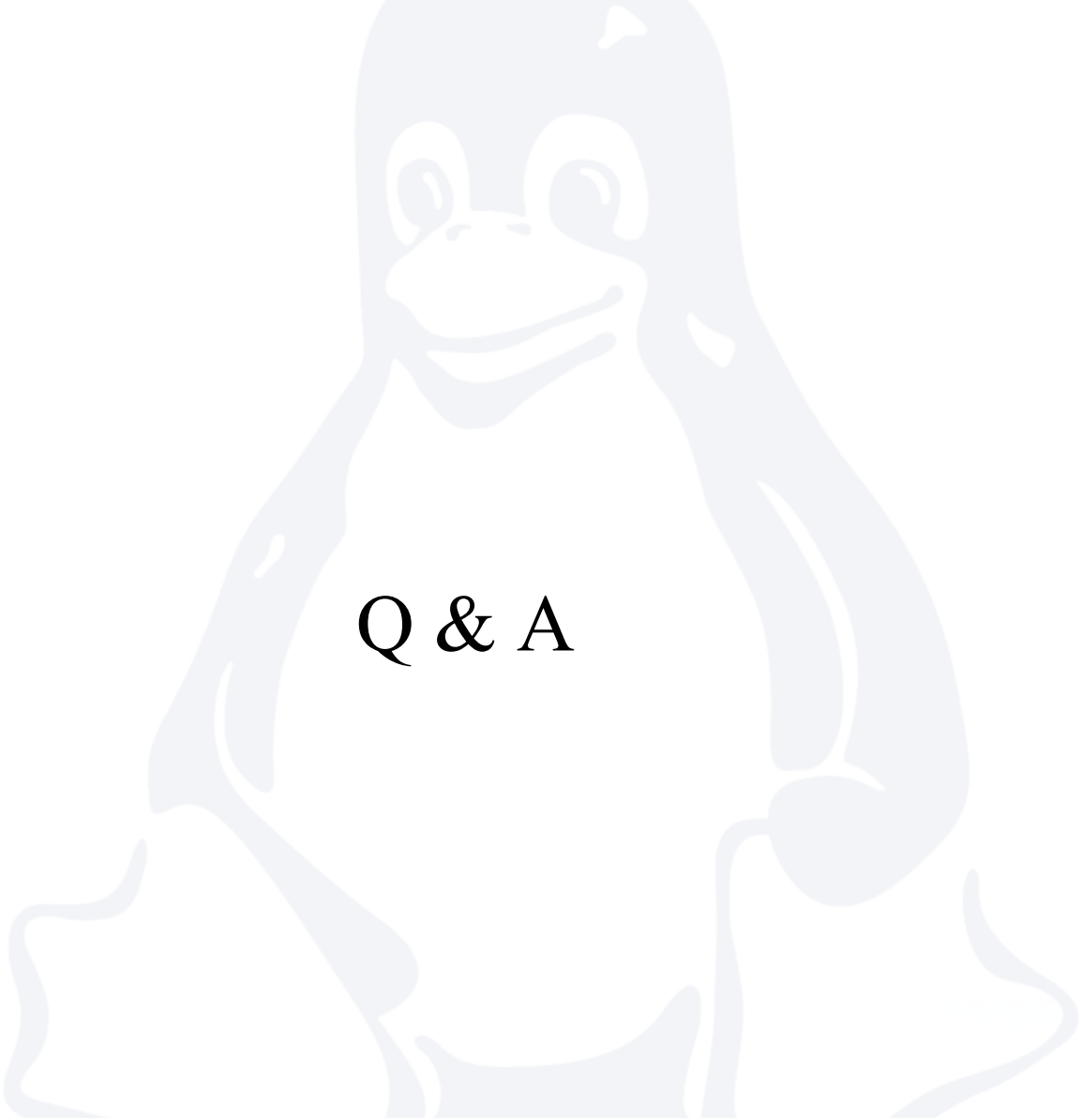
KVM Provider Dev Status (1/2)

- IBM Internal Prototype
- Implementation of
  - System Virtualization Profile
  - Virtual System Profile
  - tbc
- Providers to represent
  - VMs, Host System
  - Virtual Devices (Processor, Disk, Network Port)
  - Association between the VMs and Virtual Devices
  - Pools (Processor, Memory)

KVM Provider Dev Status (2/2)

- Short term goal
  - Implementation Guideline for KVM providers
    - Provider structure
    - Naming conventions
    - Common functionality
- Long term goal
  - Contribution to libvirt
  - while “long term” means as soon as possible ;)

Thanks



Q & A