



How to Get Started in CIM Storage Management Development

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Our Experience Getting Started

- Bluefin – arrived out of the blue in May
- Fit in exactly with our plans as management client developers
 - Standard Protocols (CIM/WBEM)
 - Breadth & depth of device management
 - Standards based data model
 - Leverage vendor activities
- We were enthusiastic supporters!



Strategic Lessons/Tactical Lessons

- Strategic
 - Where do you want to be? How do you get there?
 - Make vs Buy?
- Tactical
 - How do you avoid wasting time?



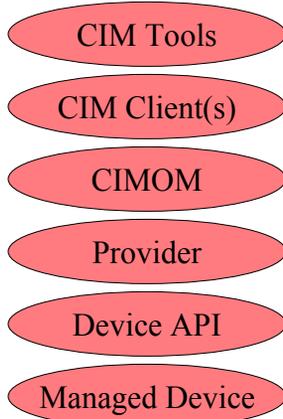
You Need a Product Strategy

- Define the product requirements
 - Full product or extension to existing?
 - Provider only or provider/CIMOM bundle?
 - Customer deliverable product?
 - Prototype only?
 - Operating environments
- Don't overlook the full life-cycle
 - Take over development after delivery?
 - Continue to contract for maintenance and enhancements?
- May need consulting services just to get started

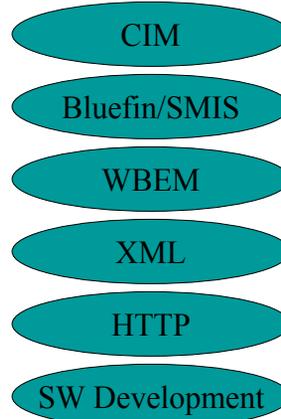


Assess Internal Capabilities

Components



Areas of Expertise



Create a Plan

- Requirements Document/Statement of Work
 - Deliverables
 - Source/Binary
 - Documentation
 - Testing
 - Compliance – Classes, Associations, Methods, Indications
 - Interoperability – CIMOMs, Clients, Devices
 - When you want it
- Technical, Business, and Marketing Resources
- Maintenance and enhancement plan



SNIA Managing the Outsourcing Process

- Select vendor based on component/expertise needs
- During development
 - Review provider/device API interaction regularly
 - Build internal expertise as needed
 - Create internal development environment
- Final hand-off
 - Internal expertise with Bluefin/SMIS by this point
 - Have development and test environments in place
 - Direct developer training for smooth transition
 - Maintain relationship for some period of transition



Conclusions

- Outsourcing is feasible, but will take effort
- Outsourcing is a **very** technical task
- Do's
 - Have your device API well documented
 - SDK is ideal
 - Know what you want
 - Prepare a plan
- Don'ts
 - Assume you won't need *any* internal resources
 - Wait to apply resources for product continuation



Tactical Stuff

- How do you avoid wasting time?



Don't be Scared / Find a Glossary

- DMTF** *The CIM standards people*
- CIM** *The modeling framework*
- WBEM** *The implementation architecture*
- SNIA** *This August Body*
- SMI** *What SNIA's doing with Bluefin*
- SMIS** *The SMI Spec.*

<http://www.dmtf.org/education/cimtutorial/reference/glossary.php>
<http://www.snia.org/education/dictionary/>



Don't be Scared / Find a Glossary

TWG	<i>Where the work gets done in SNIA</i>
DSP	<i>A DMTF Spec</i>
CR	<i>A DMTF Change Request</i>
SNW	<i>The show where we've shown our Bluefin implementations</i>
JWS	<i>A WBEM Implementation</i>
TOG	<i>The Open Group, who own a couple of other implementations</i>

- Start your Glossary today!



Plan – Keep Your Head Up

- SMIS is evolving fast. Plan to converge on a SMIS release rather than implement after the release.
 - Look at the roadmap
 - Be involved in your TWG
 - Help get SMIS right for you!
- Have good relationships with your counterparts
 - Clients - have good relationships with device vendors
 - Provider writers – cultivate relationships with clients
 - Participate in CIM SAN!



Know the Organizations, Specs and People

- DMTF
 - **CIM & WBEM specs**,
http://www.dmtf.org/standards/standard_cim.php
 - **Events – DevCon**
 - **SNIA Liaison** – John Crandall (*crandall@brocade.com*)
- SNIA
 - **TWGs**
 - **MP** Management Protocols
 - **DRM** Disk Resource Management
 - **SML** Storage Media Libraries
 - **FC** Fibre Channel
 - **NAS** Network Attached Storage
 - **MAP** Management Applications



Know the Organizations, Specs and People

- SNIA
 - **SMI**, *http://www.snia.org/tech_activities/SMI*
 - Bluefin, *http://www.snia.org/members/bluefin/data/Bluefin_Spec.pdf*, or mail *td@snia.org*
 - **TWGs**
 - **MOFs, Instance MOFs**
 - **Whitepapers**
 - **CIM SAN**
 - Plugfests
 - Demos
 - Interest Group,
<http://www.snia.org/apps/org/workgroup/techcenter/cim-san-int>



Functional Design

Are you a consumer or a provider?

- Consumers: define your functionality
 - Device management? Asset tracking? Live Monitoring? Trending/Analysis?
 - What Bluefin profiles fit your functionality?
 - Get involved with MAP!
- Providers:
 - How does Bluefin model/functionality map to your device?
 - What else does your device do? How to handle extensions?
 - Vendor extensions
 - Get involved with your TWG(s)
 - And get involved with MAP!



MOF Design

- Really Schema Design
 - Minimally: just subclass, don't "design"
 - But "design" your implementation, e.g. instance mofs
 - Vendor extensions (vendor differentiation)
 - Marquee Functionality
 - Process Indications (Alerts)
- CIM Certification (DMTF members only)
 - <http://www.dmtf.org/standards/certification.php>
 - Checks mof for CIM spec compatibility
 - Fairly new process



Tools

- CIMOMs & Client Libraries
 - Pegasus (C++)
[<http://www.openpegasus.org/>]
 - And pegasus-lite
 - Java WBEM Services (Java)
[<http://wbemservices.sourceforge.net/>]
 - SNIA CIMOM (Java)
[<http://www.opengroup.org/snias-cimom/>]
- Choose based on
 - Language
 - Licensing
 - Available Expertise
 - Deployment Ambitions



Tools II

- Sample Code
 - With CIMOMs
 - On CIM SAN site
<http://www.snia.org/apps/org/workgroup/techcenter/cimsan1/documents.php>
- Development Tools
 - Sadly, there are very few:
http://www.snia.org/tech_activities/SMI/CIMOM_Survey
 - Provider Writers:
 - CIM Browsers
 - CIM Miner, from CIM SAN site
 - Client Writers:
 - Use instance MOFs with a local CIMOM
 - From CIM SAN site
 - Or from your friends



Try Stuff

- Try clients against instance mofs
- Try providers against cim workshop/cim miner
- Try both sides of the fence
 - Client writers will understand provider issues better once they've written one
 - And the converse is true also

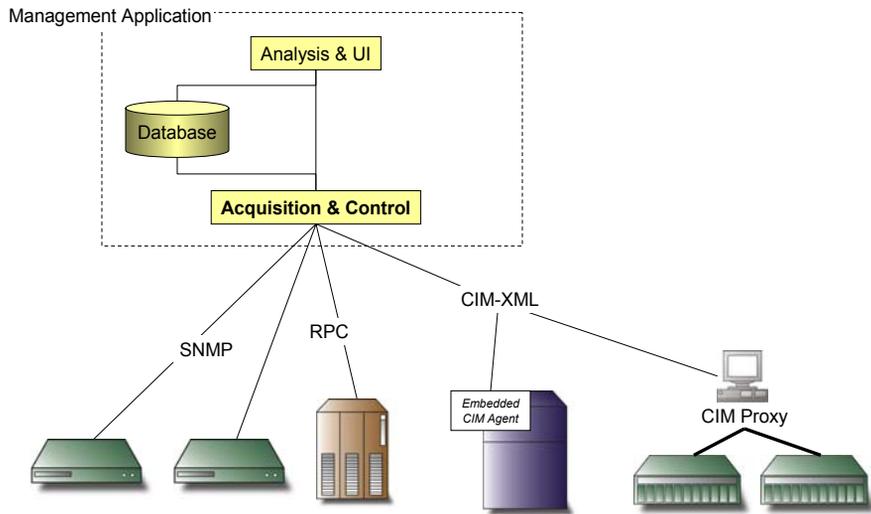


Architecture Starting Points - Clients

- Simple Clients
 - Plagiarize example code
- Management Clients
 - Treat bluefin profile(s) as one more device to add
 - Start from scratch / Rearchitect



Treat SMIS Profile as one more device

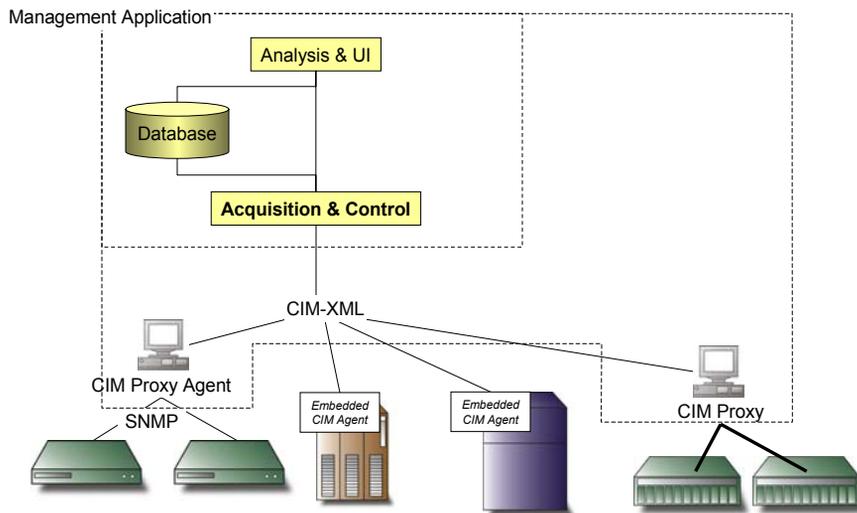


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Or Start from Scratch



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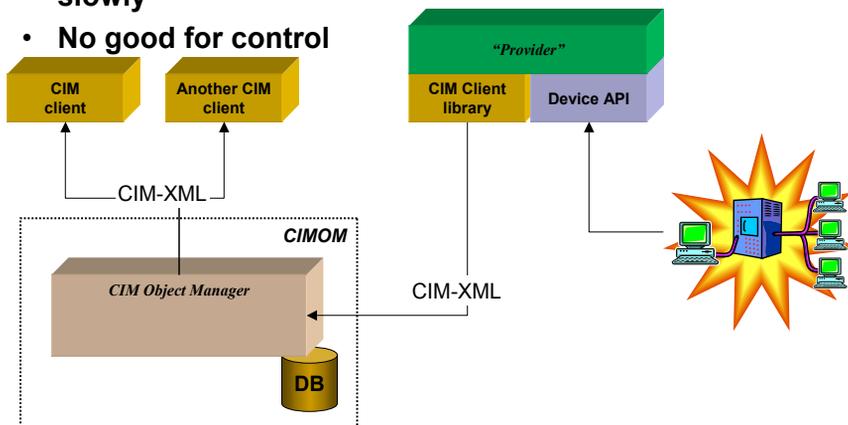
Architecture Starting Points - Providers

- Providers
 - Proxy Providers
 - Static
 - Dynamic
 - Local vs Remote
 - Embedded



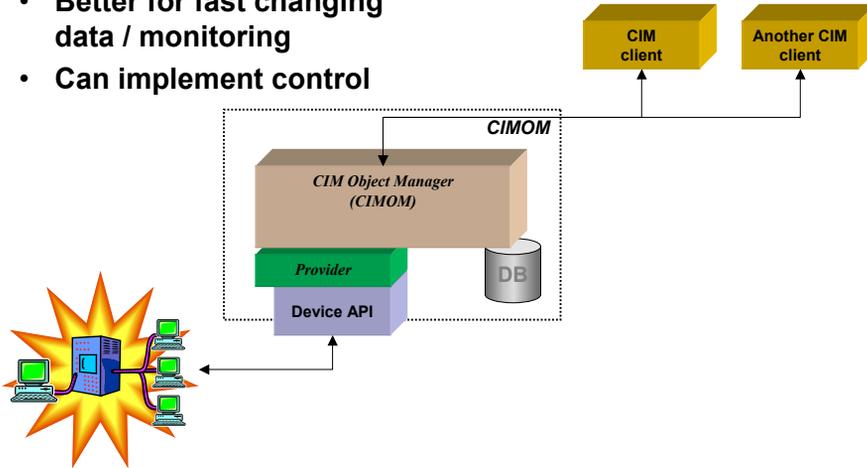
Static/Polling Provider

- **Ok for data that changes slowly**
- **No good for control**

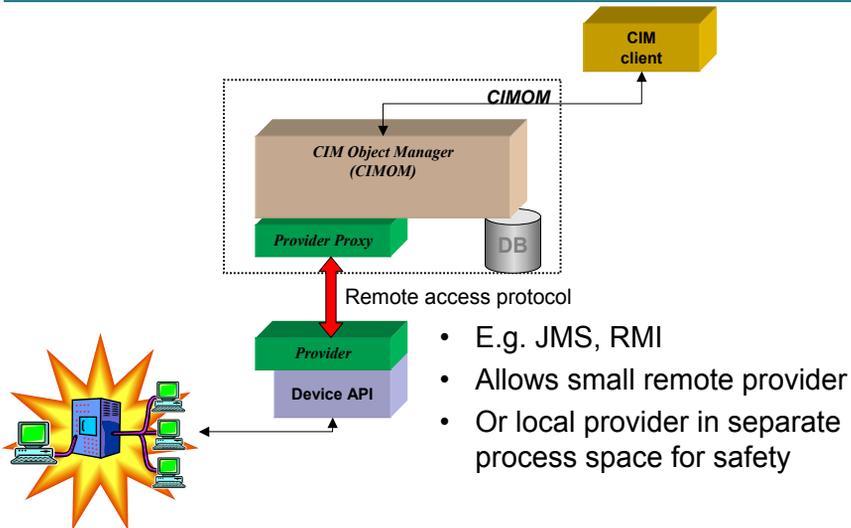


Dynamic Provider

- Better for fast changing data / monitoring
- Can implement control



Remote Provider



- E.g. JMS, RMI
- Allows small remote provider
- Or local provider in separate process space for safety



Related Technology

- SLP
 - OpenSLP, www.openslp.org
- https



Testing/Validation

- CIM SAN
 - Participation
 - Compliance Validation (CIM-SAN-2)
- Bluefin Compliance Certification
 - ICTP for SMI



Deployment Plans

- You should have one
- But that takes us beyond “getting started”



Summary

- Get Involved
- Get Tools
- Get Help
- Get Started



Questions

