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WIMS CIM Update Project Status

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WIMS CIM Update Project

- (If you've seen the intro before, skip to slide 9.)

- Alliance partnership between PWG and DMTF (Distributed Management Task Force), dmtf.org

- DMTF is a large industry consortium

  - Home of CIM: Common Information Model (for management)

  - Many CIM and CIM-related standards

  - Also recently SMASH, DASH, WS-Management

  - Numerous working groups with specific areas of concentration

    - Server, Desktop & Mobile, Core Schema, Architecture, WBEM Interoperability & Protocols, etc.

  - Mainly conference calls, regular face-to-face meetings

  - Very sophisticated web sites

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- Bring the CIM model of printing up to date with PWG models
  - CIM schema includes classes for Printer (device), PrintService, PrintJob, PrintQueue
  - Current classes missing many interesting attributes
    - CIM_Printer class has approx 30 properties; by comparison PrinterMIB has approx 140 properties
  - Current classes not clearly defined
    - CIM_Printer contains some aspects of PrintService's logical printer
- Ensure that every property in CIM printing-related classes is implementable interoperably
  - Build prototype providers

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Participants

- Active participants

  - Dell: Rick Landau

  - High North: Ira McDonald

  - IBM: Harry Lewis

  - Lexmark: Jerry Thrasher

  - Samsung: Walt Filbrich

  - Sharp: Craig Whittle (WIMS Co-Chair)

  - Bill Wagner (WIMS Chair)

  - Xerox: Peter Zehler

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What's Missing

- Current CIM_Printer (and other) classes are pretty basic

- Some categories of management information entirely absent
  - Console displays and lights
  - Input trays, output trays, input media
  - Media paths, markers
  - Toners, colorants, and other supplies
  - Communications channels and language interpreters
  - Counters

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Process to Change the Model

- In DMTF, submit Change Requests (CRs) to change CIM classes or define new classes

  - Concentrate on printer as device first, then service, job, queue

  - Change in phases: cosmetic changes, corrections, major restructuring

- Decide on changes, draft CRs, submit CRs to appropriate CIM Working Group

  - Anything printer-related is in the CIM Core Schema Working Group

- In WIMS-CIM, we

  - Selected a range of printers and use cases

  - Selected properties to move forward from Printer MIB

  - Developed a model of class inheritance and relationships, and changed it several times

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Why CIM?

- WIMS group has put a stronger emphasis on CIM in recent past

- CIM is the management information model of the future

  - All major management vendors moving in this direction

  - If something is not manageable in CIM, at some point, it won't be manageable at all

  - For a long time

- CIM is the path to web services

  - WS-CIM is a standard mapping of the CIM Schema to XML for use by web services

  - WS-Management already published

  - Second generation "harmonization" of WS-Man and WSDM in the works

Change in Emphasis

- Received considerable push-back from CIM Core WG about writable properties
    - Especially the writable-if-the-device-cannot-sense-reliably ones
    - Restructure these

- Response: simplify the CIM printer-related classes
    - Read-only: for the near term, concentrate on monitoring
        - Use object methods to modify device behavior, contents of properties
        - Proxy implementations in the near term are not likely to have SNMP write access, anyway
    - Remove some priority B properties, especially if they are writable
        - E.g., OutputTray.StackingOrder, OffsetStacking
    - Prioritize order of class submissions to work on "most important" classes early

Many Changes to the Model Recently

- Altered class structure slightly

- Removed the term "subunit" entirely

- Several new associations

- Changed the representation of a large group of properties

- Moved XxxDefault properties

- Moved ConsoleDisplayBuffer

- Added Finisher

- Decided on a representation for NetworkPrinter

- (Look at the latest Visio diagrams)

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Change - New Subunit Classes

- Doing major surgery on CIM_Printer (the print device)

  - Add ten classes analogous to prtXxx tables

    - InputTray, OutputTray, Interlock (note name change), MediaPath, Marker, Supply, Channel, Interpreter, ConsoleLight, Finisher

    - Actual class names have "CIM_Print" prefix

  - Add special classes analogous to prtAlert, following existing CIM profile: AlertLog, AlertRecord

  - Add a class for persistent settings: PrinterSettingData

- (And never use the term "subunit")

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Change - Revised Class Hierarchy

- All the subunit classes derive from a new base class, PrinterElement

- PrinterElement is derived from LogicalElement

- Contains identifying information only

  - Key and legacy SNMPRowId properties

- (The third change in class inheritance)

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Change - New Association Classes

- Add association classes to express relationships between subunits

    - Add an association class to connect subunits to the printer device: PrinterComponent

    - Add specific association class to connect markers and finishers with supplies that they use

    - Add specific association classes to connect interpreters to channels

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Change - Fix Properties with Mixed Representation

- Many properties in Printer MIB pack a lot (too much) information into a single variable

    - -3 = partial, at least one
      -2 = unknown
      -1 = other, no restriction

    - non-negative integer containing actual value

- Divide such variables into two properties

    1. XxxBasis property, enumerated integer:

        - 1 = other
          2 = unknown
          3 = actual value
          4 = at least one

    2. Xxx, gauge:

        - The actual value, if there is one

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Change - Defaults

- Defaults are NOT in the Printer base class

  - Printer MIB contains a number of prtDefaultXxx properties

  - We expected to add those to the base Printer class, but that would have been another data-value-based "weak association"

  - Instead, they are distributed to the component classes

    - Each class with a default value has a boolean IsDefault property

    - InputTray, OutputTray, Marker, MediaPath

Change - Other Properties

- Add properties to the CIM_Printer base class
  - ConsoleDisplayBuffer becomes a string array in Printer
  - Other leftovers from Printer MIB that we think are useful
    - ConfigChanged, AlertCriticalEvents, AlertAllEvents
    - PrinterName, SerialNumber
    - CurrentOperator, ServicePerson
    - ConsoleDisable, ConsoleLocalization
- Total, in all classes, approx 120 new properties from PrinterMIB and Semantic Model

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(Old Slide from Last Quarter)   Future Challenges

- A network printer is a ComputerSystem, not a LogicalDevice

  – Obviously correct, but a major remodeling effort

  – The current model of CIM_Printer is a personal printer attached to a host computer

  – Network printer is more complex: computer system, interfaces, protocol services, profiles

  – We do not want to replace the fundamental model at this time

    - Add important manageable elements first

    - Define network printer for CIM later

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Change - How to Model a Network Printer

- Insight: A network printer is a networked computer system with a printer attached to it

- Advantages

  - Use all the standard machinery in CIM that describes networked computer systems

    - Many related classes

    - Existing profiles that describe required relationships, not our problem

  - Don't have to invent any new model of network device

  - Don't have to change anything in the (new) Printer device model

  - Much less editing

- Disadvantages

  - None (that we have discovered yet)

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Way Too Much Editing

- Many CRs to write

- Old plan:
  - Custom machine translation from MIB to MOF format, does 90% of the work
    - Add Status and Key properties by hand editing
    - Run through MOF lint and pretty printer
    - Create a DMTF CR to add the class

- New plan:
  - Start with machine translation output
  - Examine every description carefully, edit > 50% of them
  - Change representation of many properties
  - Factor common properties out, move into parent classes

- "Pipe cleaner" very useful, but still much more work that we anticipated

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Current State

- (Current state updated in the wiki)

- All Phase 1 (editorial, cosmetic) CRs approved, are included in CIM Schema 2.14, published 2006/12/04

- New class CIM_PrintOutputTray adopted by TC for v2.16

- New class CIM_PrintInputTray approved by Core, balloted at TC

- Four more classes being balloted at Core (for v2.17)
  - CIM_PrinterElement, CIM_PrintMarker, CIM_PrintSupply, CIM_AssociatedPrintSupply
  - All fingers crossed

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- This year, finish the printer device classes

  - Easy, we hope, once we get the hang of it

  - Maybe add some management functions for the lost writable properties

- Next year: update the PrintService and PrintJob classes

  - Based on IPP and Semantic Model

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Prototype Implementation

- Build a prototype implementation of a CIM Provider that embodies the new Printer device classes (Rick, Dell)

  - Proxy to SNMP printers

  - Proof point for implementability of new classes and properties

  - Possible testbed for interoperability

- Two instances of "implementation experience" are required for DMTF to promote classes from experimental status to final status

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Documents

- FTP area in ftp://ftp.pwg.org/pub/pwg/wims/wd and .../wims/cim

  - Previous CRs

  - Current property lists, proposed class structure

- URLs to key docs

  - ftp://ftp.pwg.org/pub/pwg/wims/wd/CIMCoreCR_PrintOutputTray_097.htm

  - ftp://ftp.pwg.org/pub/pwg/wims/cim/PrinterMibObjectsToAdd_conclusions_20060921_F.xls

  - ftp://ftp.pwg.org/pub/pwg/wims/cim/PrinterMibObjectsToAdd_conclusions_20060921_F_Rationale.pdf

  - ftp://ftp.pwg.org/pub/pwg/wims/cim/td_PrintClassGroupings_v10_20070208.xls

  - ftp://ftp.pwg.org/pub/pwg/wims/cim/Visio-Printer_11.pdf

Look at Documents

- What would people like to see?

  - Latest CR

  - Printer MIB and CIM_Printer MOF, with color syntax highlighting

  - CIM "Flat classes" tool for browsing CIM schema

  - Spreadsheet of proposed class grouping of properties

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Questions?

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