Web-based Imaging Management System
WIMS

Printer Working Group
April 2005

A Program of the IEEE-ISTO
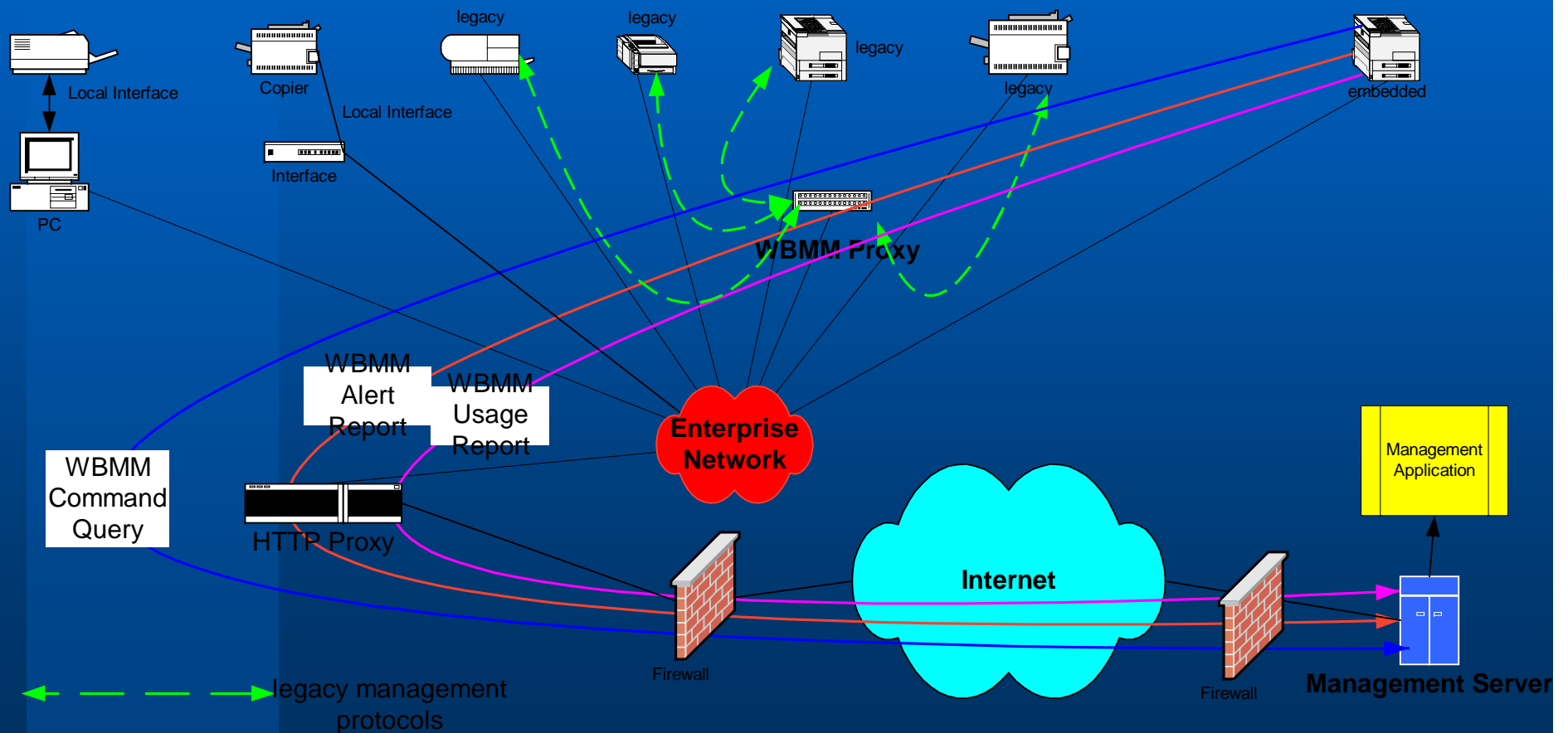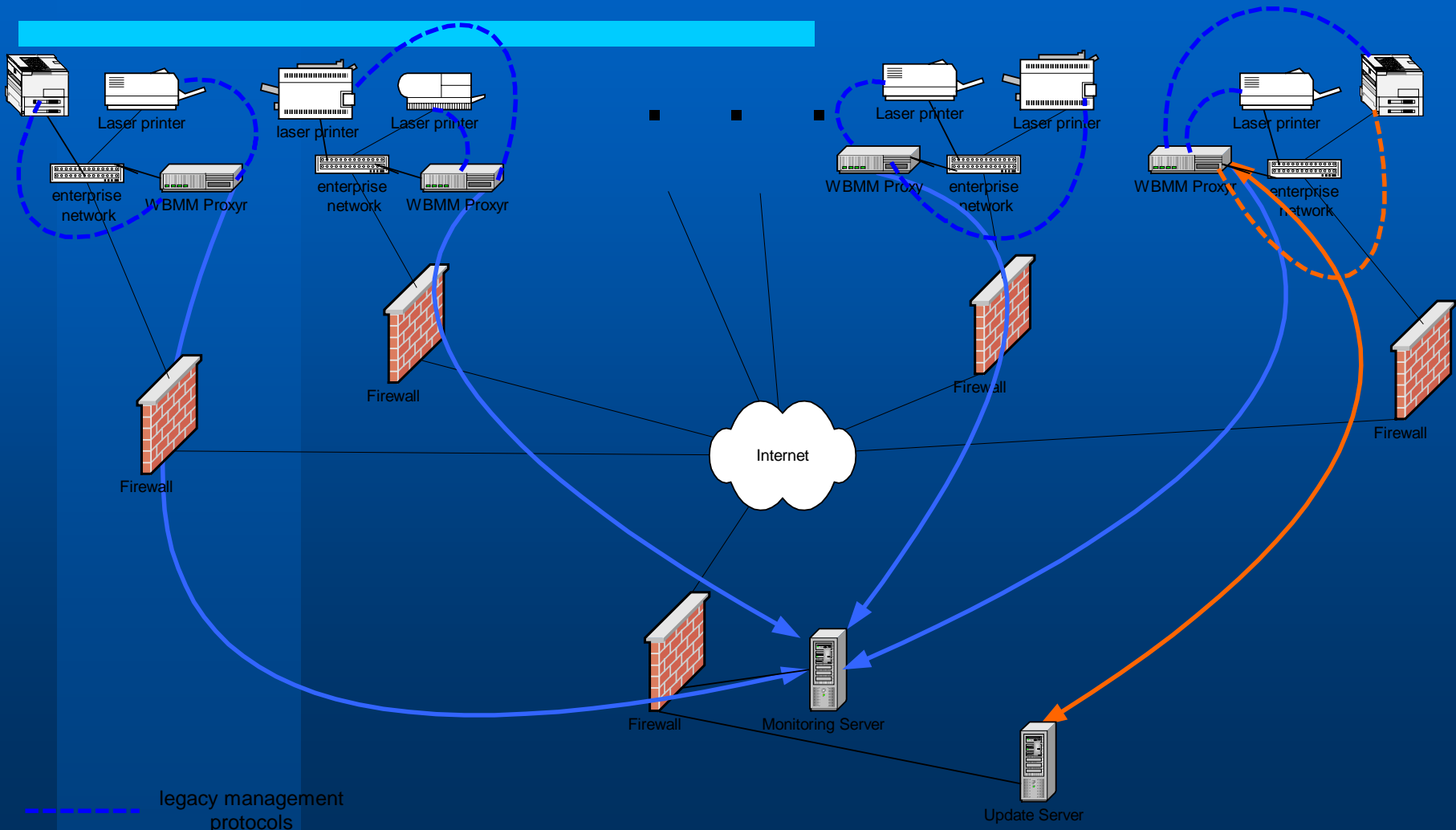
pwg

Background

- **Ten years ago, the Computer Printer Industry provided a consistent management model for Network Printers with the Printer MIB, RFC1759.**
- **Since then:**
  - **Printers and Copiers have been largely replaced with Multifunction Imaging Systems**
  - **The maintenance of these imaging systems has increasingly been assigned to third-parties or to corporate fleet management organizations**
  - **With the increasingly complex environments and systems, Web Services approaches are being used to overcome limitations in SNMP-based management**

Scenario – Remote Monitoring an Enterprise

Local Interface

Copier

legacy

legacy

legacy

legacy

embedded

Local Interface

Interface

PC

WBMM Proxy

WBMM Alert Report

WBMM Usage Report

WBMM Command Query

Enterprise Network

Management Application

HTTP Proxy

Internet

Management Server

Firewall

Firewall

legacy management protocols

Scenario – Remote Monitoring Small Sites

Laser printer
laser printer
Laser printer
enterprise network
WBMM Proxyr
enterprise network
WBMM Proxyr
Firewall
Firewall
Laser printer
Laser printer
WBMM Proxy
enterprise network
Firewall
Laser printer
WBMM Proxyr
enterprise network
Firewall
Internet
Firewall
Monitoring Server
Update Server

legacy management protocols

WIMS Working Group Goals

- **Consolidate an Imaging Systems Management Model in line with the PWG Semantic Model, and including:**
  - **The device-oriented elements of the Printer MIB**
  - **The service-oriented elements identified in the various aspects of IPP**
  - **The most critical elements of multifunction services**
- **Generate Web Services compatible schema reflected this model**

WIMS Working Group Goals

- **Design a System to**
  - **Monitor, Manage and Administer:**
    - **Hardcopy imaging devices and systems**
    - **Image processing services (print spoolers, facsimile, format transform services, etc)**
  - **In a context supporting both**
    - **fleet management (across the Internet by outside service providers) and**
    - **enterprise management (within an administrative domain by in-house staff)**

WIMS Projects

- **WIMS Protocol**
  - Defining Operations, Actions and Interactions between Manager and Agent

- **MFD Services Counters**
  - Defining Counters characterizing status and usage of services performed by Multifunction Imaging Devices

- **XML Schema**
  - Representing the Counters, Printer MIB Objects and other cogent parameters as XML Elements

WIMS Protocol

The WIMS Protocol defines three primary aspects:

- **The Agent Interface, including the operations to:**
  - initiate & allow Manager access
  - solicit a schedule of management actions
  - report on requested elements
  - provide alert information for identified events.

- **The Management Interface, including the operations by which the required management information is requested**

- **The monitoring, management and administrative actions requested of the managed entity in the schedule or the Management Interface operations.**

WIMS Protocol

- **The WIMS Protocol is defined in the abstract to allow application in the most effective way possible. The initial intent was that the:**
  - Agent to Manager interface use HTTP or HTTPS, perhaps bound to SOAP, but generally in a way fully analogous to a user accessing the WWW.
  - Manager to Agent Interface use SMTP, perhaps bound to SOAP, with the Agent receiving Emails in the same way as a human user.

WIMS Protocol - Sequence

- **A administrator responsible for a given site determines:**
  - **What imaging systems and system components are to be managed by this method,**
  - **The identity of the MANAGER, and**
  - **The degree of control and access allowed the MANAGER.**

- **This information is entered into one or more AGENTS.**
  - **The AGENT is intermediary between the MANAGER and the Managed Imaging System**
  - **AGENTS may be independent proxy entities on the network or may be embedded in the managed entities.**

WIMS Protocol – Initiatiation

- **The AGENT initiates communication with the MANAGER:**
  - **Communication may use same path as user WEB access, including HTTP Proxies and HTTPS protocol.**
  - **Mutual authentication reccomended**
  - **First WIMS operation is *RegisterForManagement* .**

- ***RegisterForManagement* provides to the MANAGER:**
  - **IDs of Communicating Agent, Manager, and Imaging System Agent**
  - **Operations, Actions, Supported by Communicating Agent**
  - **Objects Supported (e.g., ID of Imaging System to be managed.)**

- **If MANAGER agrees to manage, it responds with**
  - **Operations, Actions and Objects Supported**
 - **Schedule of Actions to be performed by AGENT**

WIMS Protocol – Basic Actions

- **Agent ACTIONS that may specified in the Schedule include WIMS Monitoring Actions and times or conditions for these actions to occur:**
  - **GetElements: Send a Report with element values at the specified time**
  - **GetResources: send a Report with the resource values at the specified time**
  - **SubscribeForAlerts: Send an Alert when a defined alert condition detected**
  - **UnsubscribeForAlerts: Remove specific Alert conditions**
  - **UpdateSchedule: Request new schedule**

WIMS Protocol

- **Schedule must include Schedule Update action, indicating when the Agent must request a new Schedule from the MANAGER.**

- **A moderated bi-directional dialog is thereby established between the AGENT and the MANAGER.**

- **Agent always has the option of restricting the information communicated to or ceasing communication with the MANAGER.**

WIMS Protocol Sequence Diagram
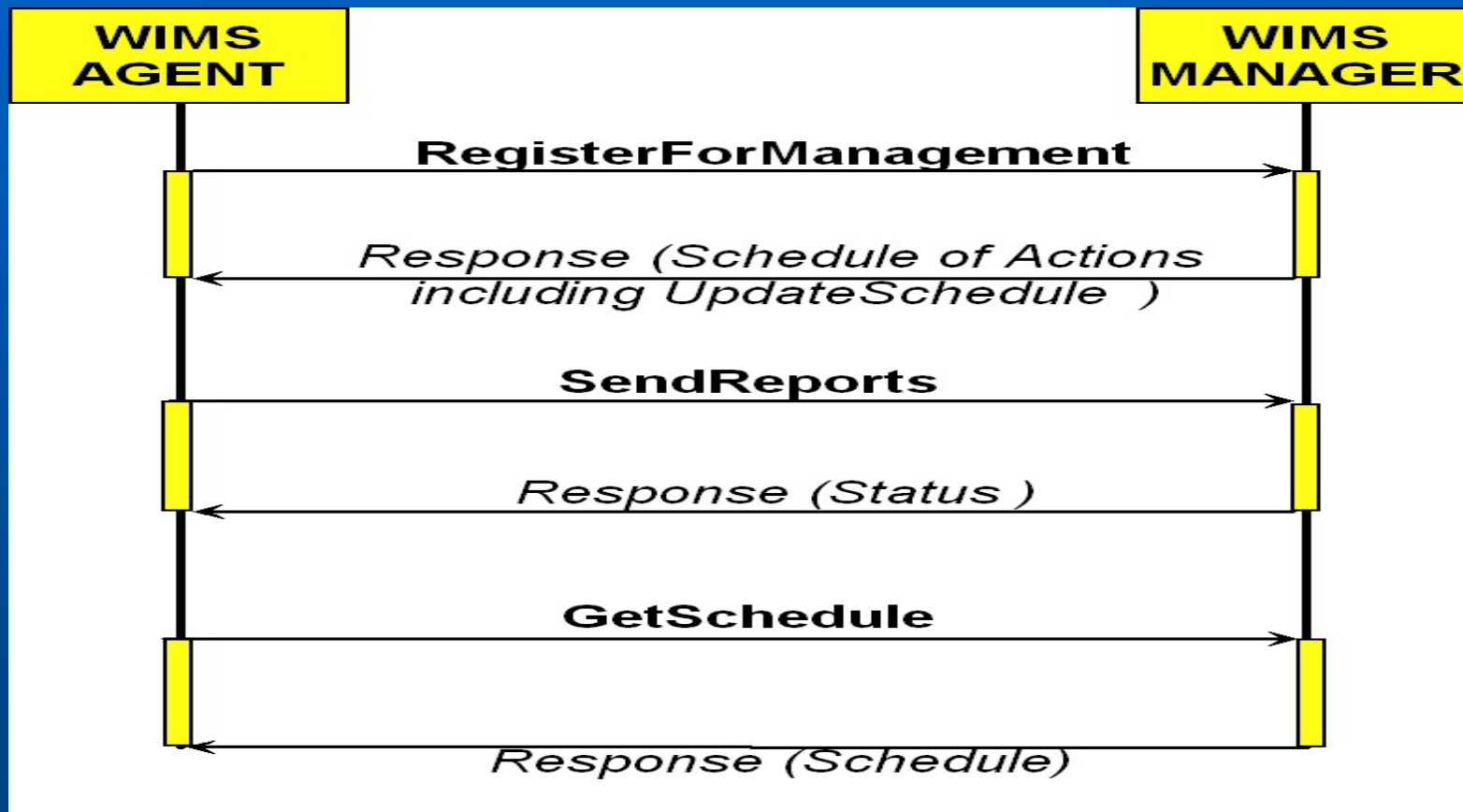
WIMS Protocol – Management Actions

- **In addition to scheduling Monitor actions, WIMS provides for the scheduling of Management Actions**
  - **Vendor**
  - **SetElements**
  - **DeleteResources**
  - **SetResources**

WIMS Protocol – Administration Actions

- **WIMS Administration Actions**
  - **Disable**
  - **Enable**
  - **Pause**
  - **Resume**
  - **PurgeJobs**
  - **Restart**
  - **Shutdown**
  - **Startup**

WIMS Protocol - Considerations

- In early implementations, WIMS Agent must be proxy, with one agent handling many managed devices and services. Proxy will communicate with managed entities using SNMP or other existing protocol.

- As protocol becomes more widespread, WIMS Agent can be embedded in managed entity. However, for security and ease of administrative control, continued use of WIMS Proxy may be desirable

Schedule – WIMS Protocol

Prototype stage

Last Call

| Jan | Feb | Mar | Apr | May | Jun | July | Sep | Oct | Nov | Dec |

Current Draft Document

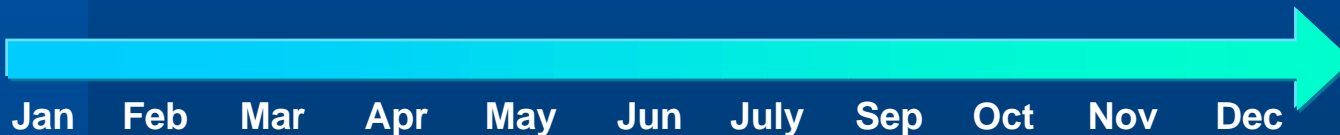**ftp://ftp.pwg.org/pub/pwg/wims/wd/wd-wims10-20050322rev.pdf**

MFD Service Counters

- **Elements characterizing most important aspects of service usage and status to provide input for:**
  - **Accounting and chargeback**
  - **Problem Correction**
  - **Periodic support and Maintenance**
- **Abstract Counters Specification**
  - **Basis for Counter MIB and Counter Schema**
  - **Compromise document after industry showed no interest in full MFD MIB.**

Schedule – Counter Spec

- MIB & Schema to Follow

Last Call

Jan Feb Mar Apr May Jun July Sep Oct Nov Dec

Currently in Last Call...

ftp://ftp.pwg.org/pub/pwg/wims/wd/wd-wimscount10-20050330rev.pdf

XML W3 Schema

- **Conversion of Printer MIB**
  - **ftp://ftp.pwg.org/pub/pwg/wims/schemas/**
- **Counter Spec – Current Draft**
  - **ftp://ftp.pwg.org/pub/pwg/wims/schemas/PwgCountersProposal091304.zip**