Web-based Imaging Management System

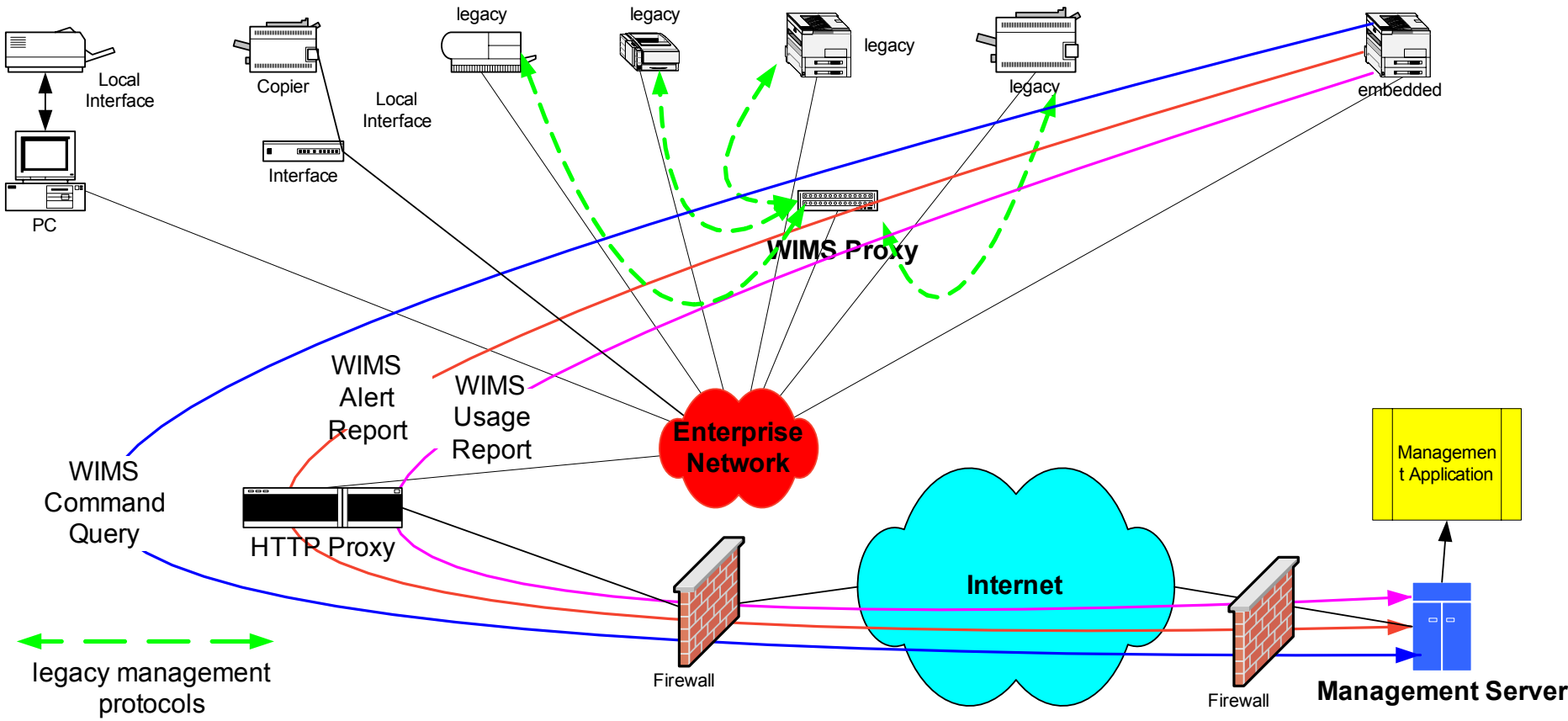
WIMS

Printer Working Group
April 2005

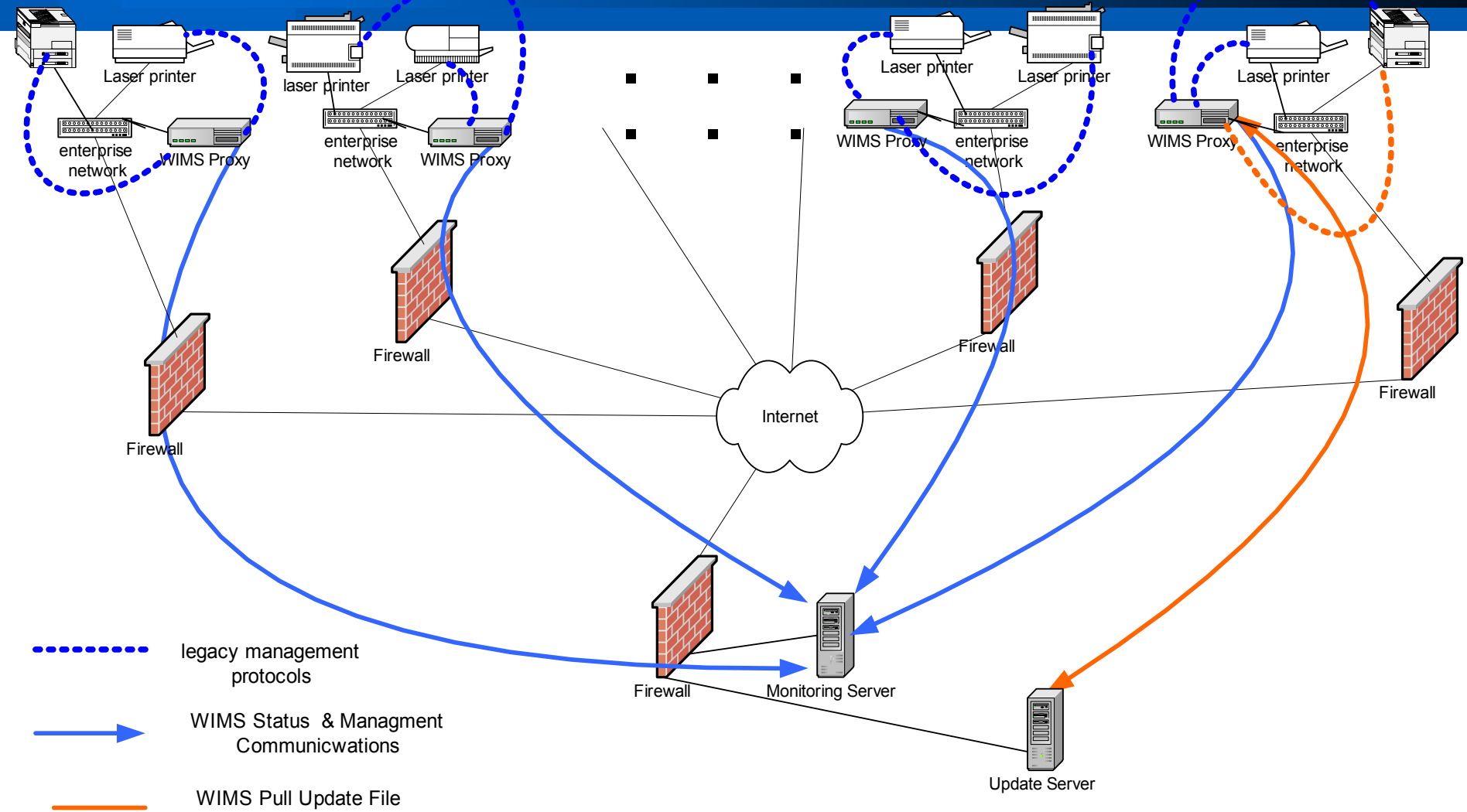
Background

- 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



Scenario – Remote Monitoring Small Sites



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 imaging and multifunction services
- Generate Web Services compatible XML schema reflecting 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
- Imaging System Counters
  - Defining Counters characterizing status and usage of services supported by Imaging Services
- XML Schema
  - Representing the Counters, Printer MIB Objects and other cogent parameters as XML Elements
- Counter MIB
  - SNMP MIB mapping of Imaging System Counters
- Collaboration with DMTF/CIM and OASIS WDSM
  - Update the Imaging Services Management Model

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, for example:
  - 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 - Operations

- The Agent Interface
  - RegisterForManagement, UnregisterForManagement
  - SendReports
  - SendAlerts
  - GetSchedule
- The Manager Interface (Optional)
  - Set Schedule
  - ExecuteAction

WIMS Protocol - Sequence

- An 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 by 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 is recommended
  - 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 the AGENT

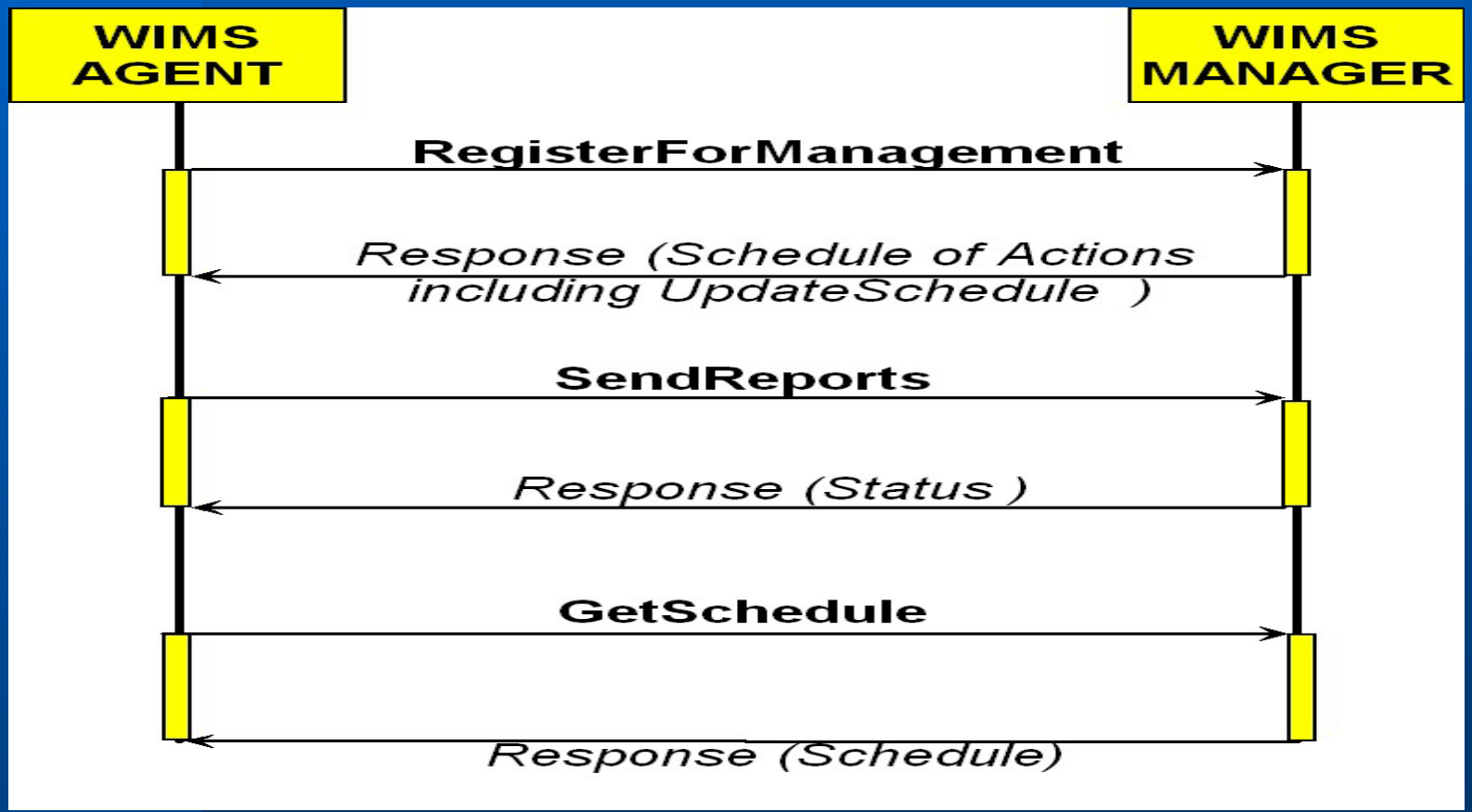
WIMS Protocol – Basic Actions

- 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 Update Schedule 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, ceasing communication with the MANAGER, or UnregisteringForManagement.

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

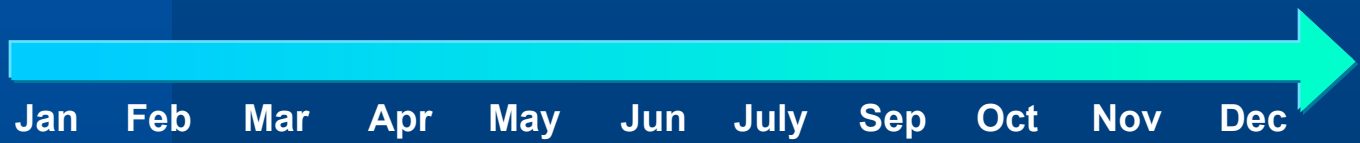
WIMS Protocol - Considerations

- 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

WIMS Protocol – Schedule

Prototype stage

Last Call



Current Draft Document

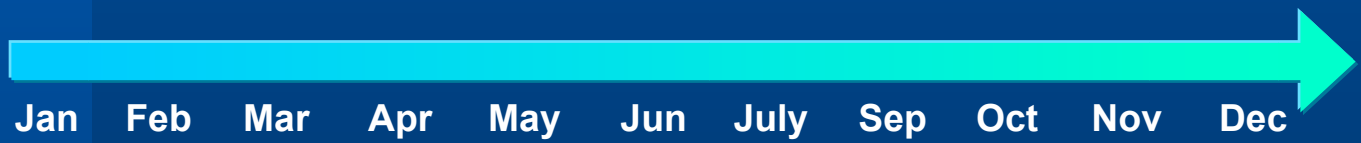
ftp://ftp.pwg.org/pub/pwg/wims/wd/wd-wims10-20050322rev.pdf

Imaging System 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

Schedule – Counter Spec

Last Call



Currently in Last Call...

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

XML W3C 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