

Management of Networked Multifunction Devices

Extending the Printer MIB to Networked Multifunction Devices

MFPA Multifunction MIB Initiative

Presentation to the PWG/PWG-C

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W. A. Wagner, NETsilicon, Inc.

Outline of Presentation

- **Objectives**
- **Overall Approach to MFD Management**
 - » **Background**
 - » **Why a standardized Network Management Approach?**
 - » **What is “Managed”?**
 - » **Printer MIB & SMNP as an Example**
 - » **Use of Existing Management Structures - Printer MIB**
 - » **Applying Approach to Multifunction Devices**
 - » **Constituent “Function” MIBs**

Outline of Presentation

- **Questions**
- **Break**
- **Detailed Consideration of MIB drafts
(Ron Bergman, Hitachi-Koki)**
 - » **Scanner MIB**
 - » **Image Processor MIB**
 - » **Facsimile MIB (modem)**
- **Discussion**

Objectives of the Presentation

- Standardized Approach to Device management for the network contributed to success of networked printers
- Compatible capability necessary for success of Multifunction Devices
- MFPA proposes Management approach and structure evolved from PWG Printer MIB
- For success, must have:
 - understanding
 - agreement
 - consistent adoption

Objectives of the Presentation

- MIBs are Work in Progress
- Need Participation, Comments & Contributions
 - » **MIB/SNMP/Management**
 - » **Multifunction Capabilities**
 - » **Details of managing individual functions**
 - **Printing**
 - **Scanning**
 - **Copying**
 - **Internet Facsimile**
 - **Document Storage and Retrieval**
 - **PSTN Facsimile**
 - **Image Processing**
 - **Network Services**
 - **Other functions**

Background of Device MIBs

- Early 1990's: Printers evolved from peripherals to networked devices
- 1993 to 1995: Need for management over the network addressed by the Printer Working Group with the Printer MIB (RFC-1759)
- 1994 to Present: Extensive base of SNMP clients using Printer MIB
- 1996 to 1998: Printer MIB refined and updated (draft-ietf-printmib-info-04.txt)
- 1997 to 1999: Job MIB, (RFC-2707) & Finisher MIB(addition to updated printer MIB)

Background of Device MIBs

- 1997- 1998: Increased use of Networked Scanners, FAX, Digital Copiers as Networked Devices
- 1998: Raymond Lutz of MFPA adapts Printer MIB to scanners
- 1999: Need for integrated approach to management of Multifunction Devices recognized
- Late 1999: MFD MIB approach developed and initial constituent MIBs generated
- NOW: Coordinate MFD approach with existing Printer MIB, and management requirements of MFD constituent functions

Why is a standardized device management structure necessary?

- Networked devices are remote to administrator, maintainer, user but access must be as convenient as if units were local
- A network may have units of multiple types and manufacturers, but customers want consistent mode and level of access

What is included in device management?

- Device identification and capabilities
 - » **type of unit, manufacturer, model , speed, capacity,**
- Configuration:
 - » **memory, input devices, image processing capabilities, finishing devices**
- Location and responsible parties:
 - » **physical location, network location, contact person, operator**
- Connection information:
 - » **how to access for use and for extended management functions**

What is included in device management?

- Setup and Status:
 - » **device state, supplies status, fault conditions**
- Statistical information:
 - » **consumables use, number and nature of jobs processed**
- Accounting information
 - » **resources utilization and charge-back information**
- Default conditions
 - » **default job processing instructions such as media type, job delivery, resolution, etc.**

Requirements of a Multifunction Management Approach

- Compatibility with existing network device management capabilities.
- Compatibility with existing network management applications.
- Adequacy in addressing characteristics to be managed.
- Expandability to include enhanced and future new multifunction features.
- Consistency and commonality in implementation so that a common management system can be used.

Relation to Printer Management

- Printer management well established, mature, widely deployed & supported,
- Print Function is primary constituent of Multifunction Device
- Print management addresses many features common to other Functions, including
 - » **identification of general computing resources**
 - » **media handing**
 - » **operator's console**
 - » **alarms and alerts**
 - » **job monitoring**

Review of Printer Management

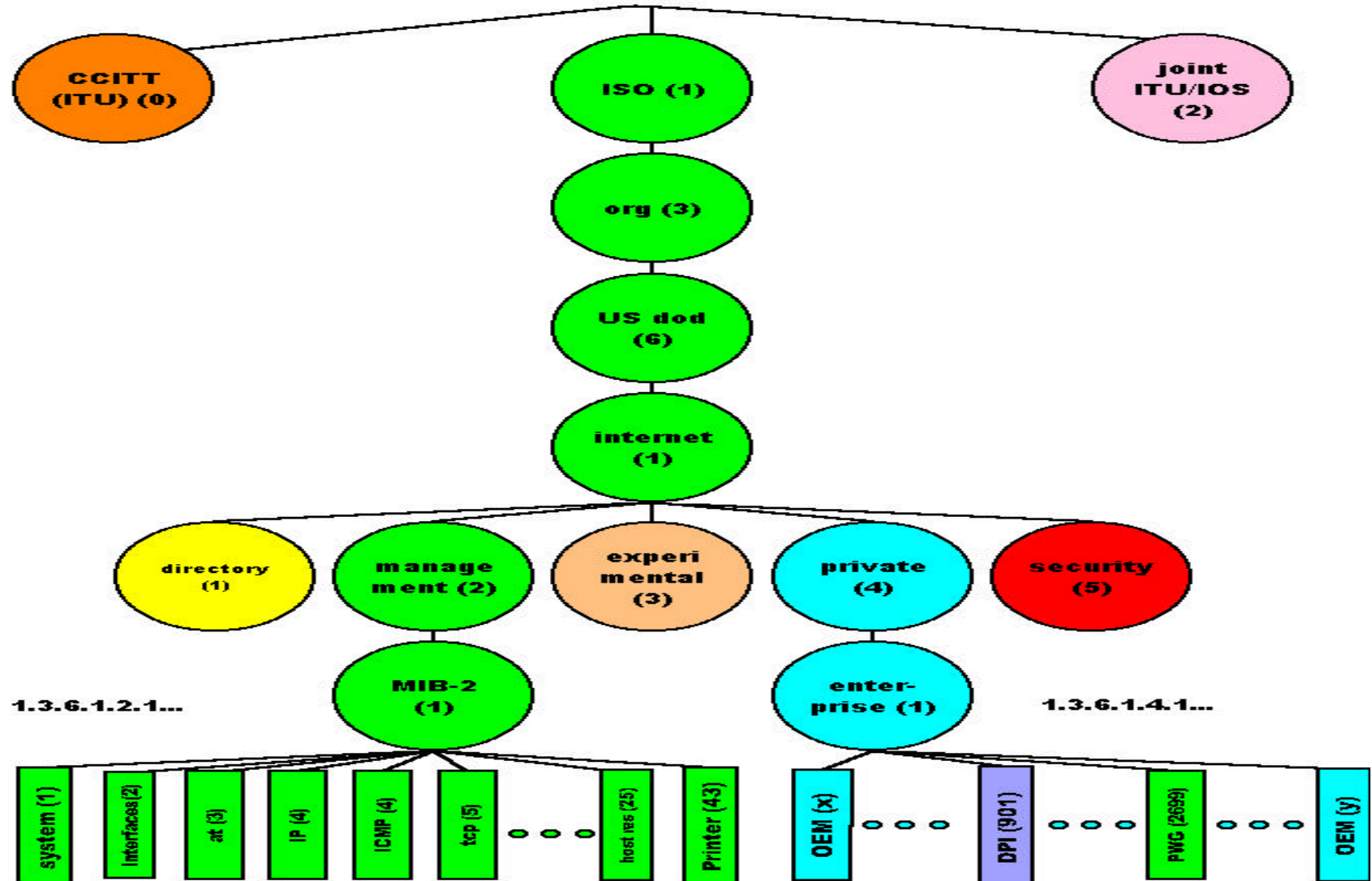
Two Current Methods: SNMP and HTTP.

- **SNMP:**
 - » **prevalent network management method.**
 - » **best chance of commonality.**
- **HTTP:**
 - » **uses standard WEB Browser**
 - » **more individual, less structured**
- **MIB:**
 - » **basis for a consistent and complete identification of the primary objects**
 - » **provides structure necessary for both web-based and SNMP based device management**

MIB Characteristics

- **Use Universal Naming Tree to derive Object Identifiers (OIDs)**
- **Structure format for consistent presentation**
- **“Tables” or vector representations to cover multiple instances of same type of object**
- **Utilizes existing management structures wherever possible.**
- **Ability to “deprecate” groups**
- **Complied by SNMP application programs to derive specific network interactions**

Universal Naming Tree

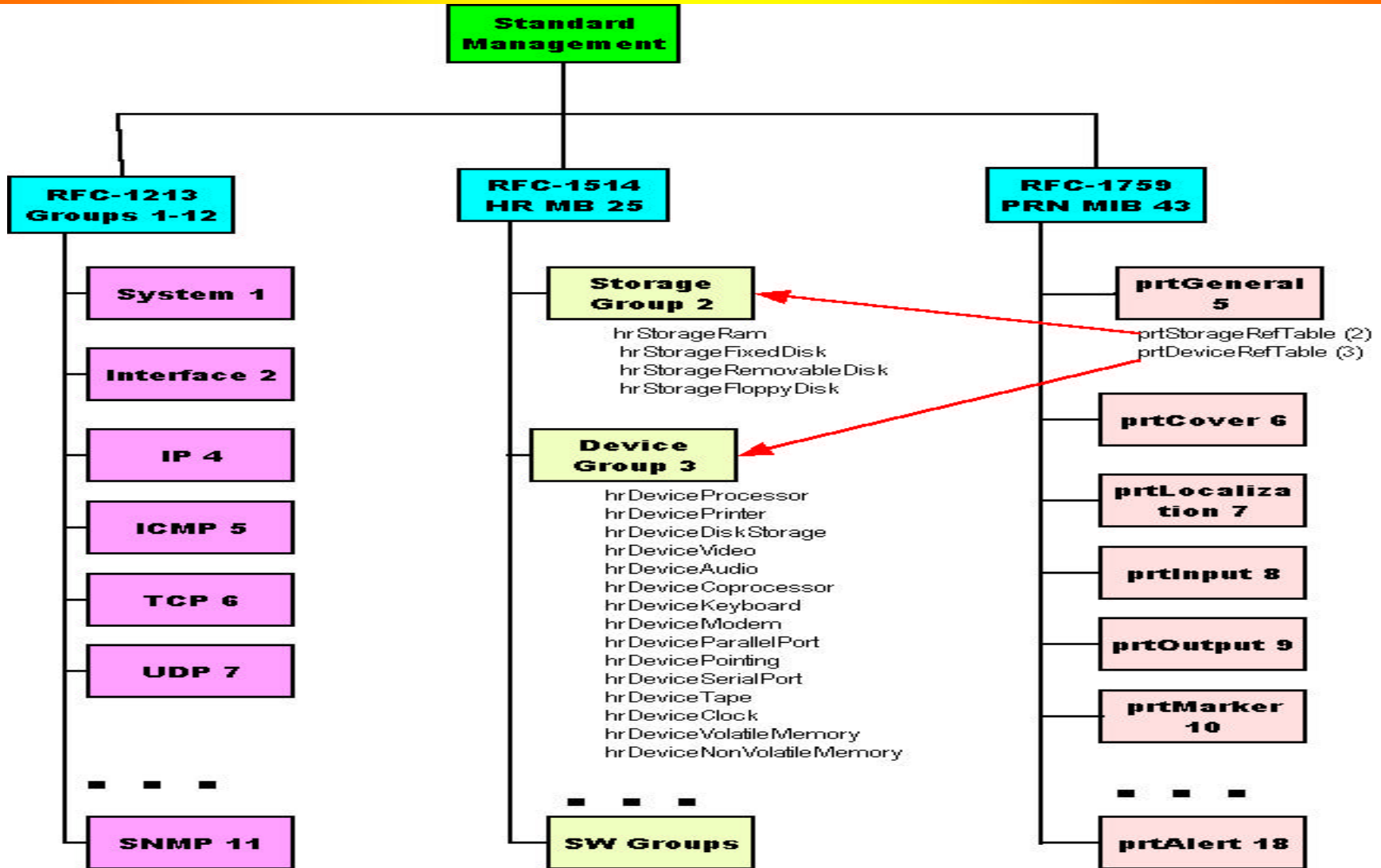


MFD MIB MFPA/PWG

Management with Multiple MIBs

- **Basic MIB2 (RFC1213) addresses network node characteristics**
- **Use of Host resources MIB RFC 1514 recognizes the “Controller” is basically a networked computer**
- **HR MIB lists storage facilities and Devices , provides summary status of device**
- **Printer MIB can associate itself with listed devices (e.g., hard disks)**

MIB Interrelation for Printer



MFD MIB MFPA/PWG

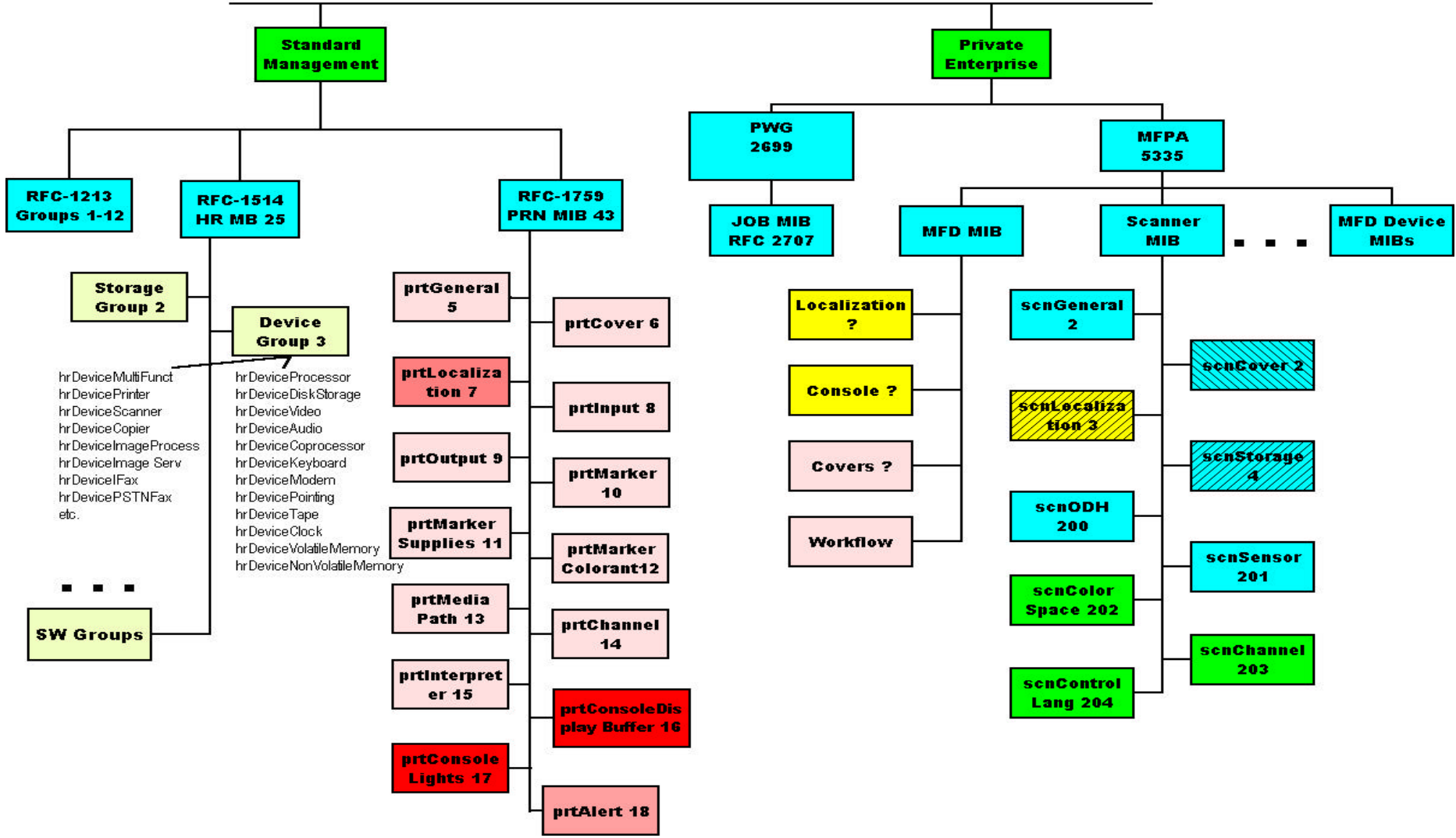
Applying PRN MIB Approach to Multifunction Devices

- **Printer MIB:**
 - » networked special purpose computer with Print function
- **MFD MIB:**
 - » networked special purpose computer with Print, Scan, Copy, FAX, etc.
- **Basic Interface objects in RFC-1213**
 - » physical interface and basic network protocol

Applying PRN MIB Approach to Multifunction Devices

- **Computer Device Objects in Host Resources MIB:**
 - » **memory, disk storage, keyboards, video, audio, etc**
- **Index of devices (including Functions) in Host Resources MIB**
 - » **Print, Scan, Image Process, Store, FAX, etc.**
- **Common “Unit” objects in Host Resource MIB???**
 - » **Errors, Alarms and Alerts; User Panel, ?**
- **Function-Specific Objects in Function-specific MIBs:**
 - » **Print, Scan, Image Process, Copy, Store&Rerieve, FAX, etc**

Applying PRN MIB Approach to Multifunction Devices



MFD MIB MFPA/PWG

Applying PRN MIB Approach to Multifunction Devices

Conflicts and Confusions

- Must maintain compatibility with Printer MIB
but
- Some groups in Printer MIB apply to Overall MFP
 - » localization
 - » console
 - » alert
 - » cover

Considerations for Resolution

- Groups that already exist in the printer MIB are reused for the MFD without renaming them
- Alert group kept in Printer MIB, but hrDevice index used to assign alert to function
- Multiple tables of same type used in Function MIBs if necessary to differentiate by function

» e.g., print specific scan specific, device general covers

Users do not interface directly with the MIBs, applications do. Therefore, intuitive organization less important than un-ambiguousness, completeness and structural consistency

Contacts & Access

MFPA mfpa-list@egroups.com

- R. Lutz Cognisys, Inc.
raylutz@cognisys.com
- R. Bergman Hitachi Koki
rbergman@hitachi-hkis.com
- B. Wagner NETsilicon, Inc.
wwagner@digprod.com