CWMP Protocol for the Print Industry

Adoption of the Telecom (Broadband Forum) standard for remote device/service management for the print industry

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Goal

- Define a Standard MFP Data Model and Services template to enable a number of Print Managed Services (similar to telcom industry) and new business model

Broadband Forum - Introduction

- Established in 1994
- Develops multi-service broadband specifications
- Addresses interoperability, architecture and management.
- Mission: to enable home, business and converged broadband services, encompassing customer, access and backbone networks.
- Over 500,000,000 Customer Premises Equipment (CPE) devices are currently deployed in the field. The managed devices utilize the global industry leading TR-069 protocol & associated data models.
- Developed more than 100 Technical Report (TR) specifications (as of 2010).
- More than 180 active membership of service providers, and core technology, software and device vendors.

CWMP Highlights

- Created by the broadband forum to replace SNMP as a platform for a services led model of management of consumer devices connected via the Internet behind firewalls
  - Uses TCP (Reliable, no issues with bulk transfer), Passing of http traffic through firewalls, Avoidance of persistent connections, Usage of XML (extensibility, tools)

- Auto Configuration Server is built to remotely manage millions of devices, upgrade firmware, and turn on new services
  - Auto-configuration and dynamic service provisioning
  - Software/firmware image management
  - Status and performance monitoring
  - Diagnostics reporting
  - Identity management for web applications
  - Standard north bound connections for OSS/BSS/CRM type applications

- Secure
  - Prevent tampering with the management functions of a device or the management server, or the transactions that take place between them
  - Provide confidentiality for the transactions that take place between a device and the server
  - Allow appropriate authentication for each type of transaction.
  - Prevent theft of service

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CWMP Management Standard
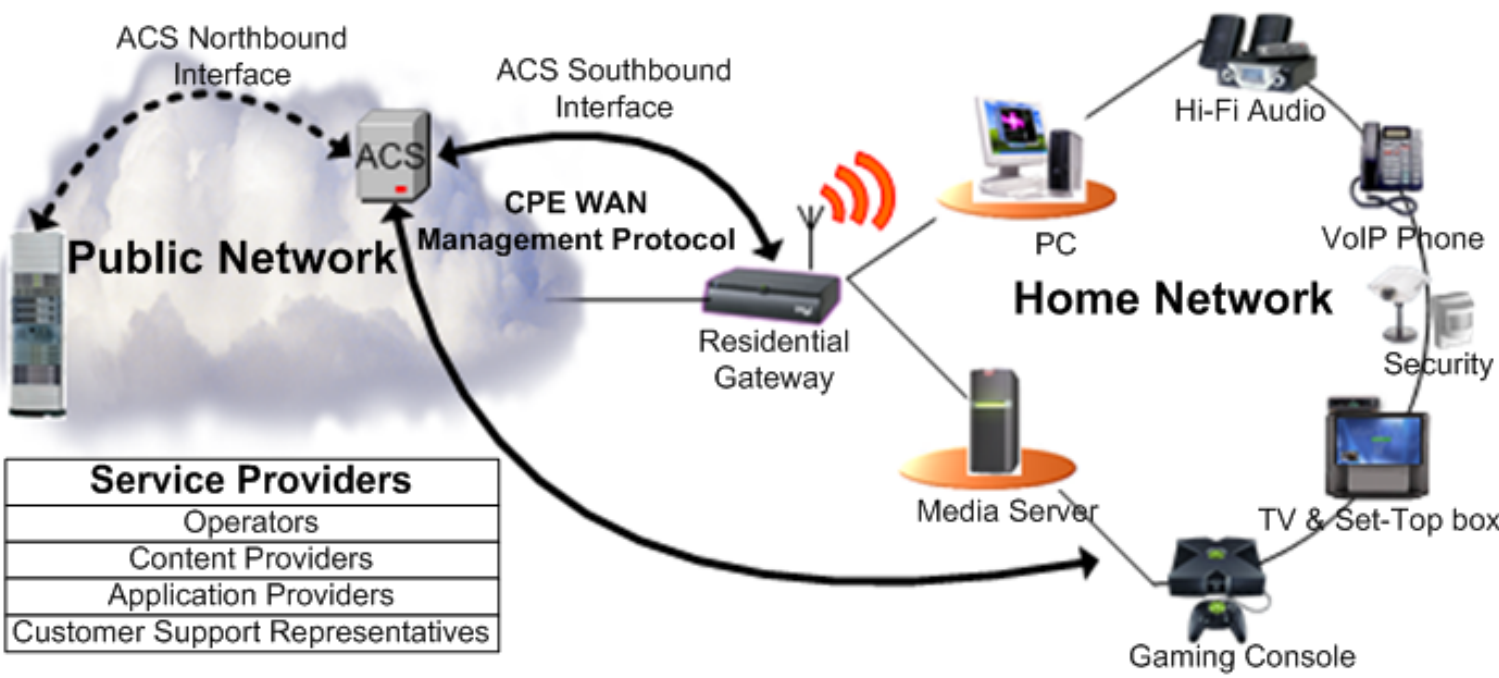
CWMP - Customer Premises Equipment WAN Management Protocol

Service Providers View

Adding MFPs to the ecosystem
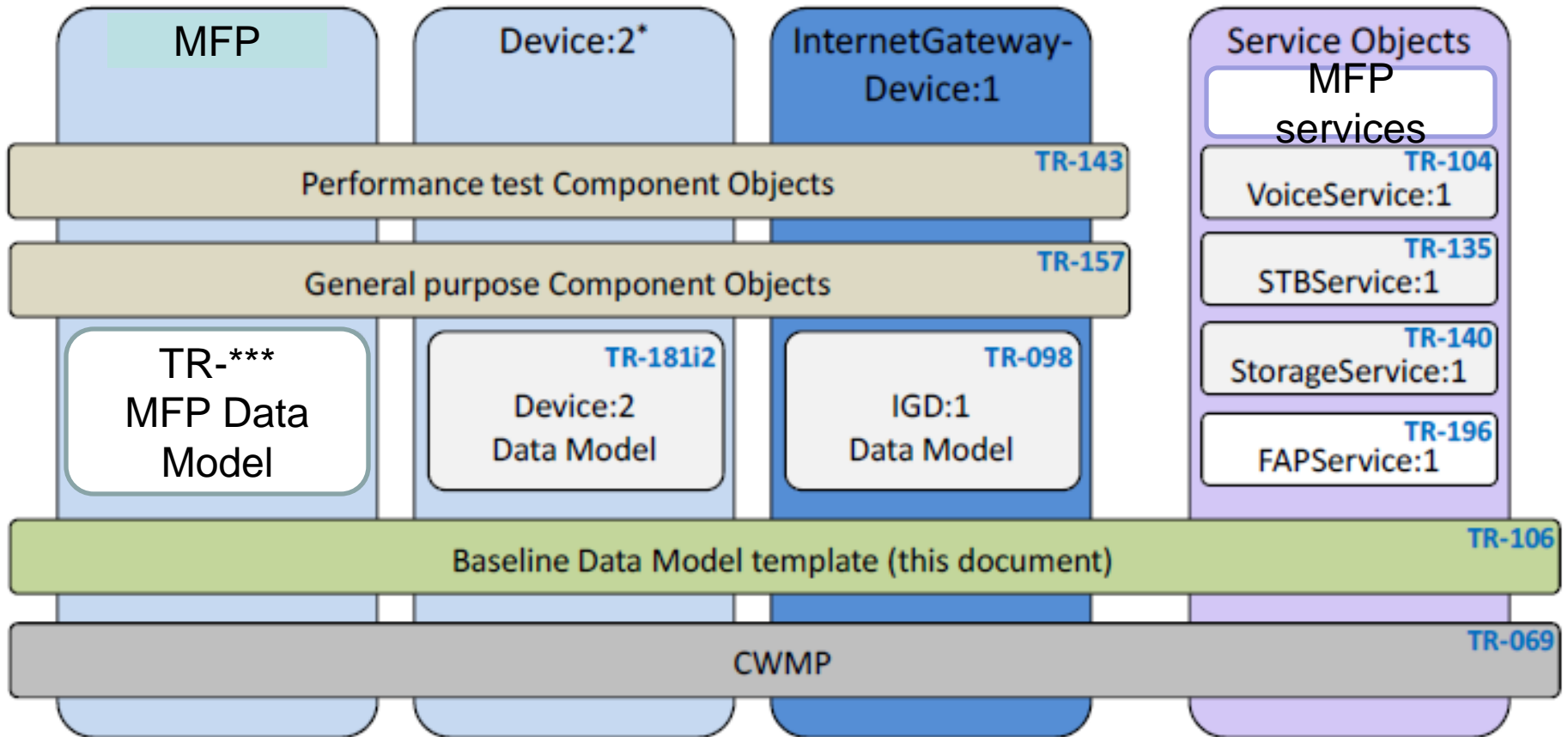
Benefit of CWMP for the Print Industry

- Industry moving towards managed services
- Need an industry standard that enables a remote managed service:
  - Ability to manage devices through its lifecycle – deploy, install, manage and support
  - Multivendor devices (MFPs and other classes of devices to enable transition to a MSP/IT environment)
    - Extensible to remotely manage multivendor MFPs, PCs, UPS, converged communication devices etc.
    - Get over the numerous private MIBs
  - No Proprietary protocols/management servers to traverse firewalls (firewall friendly from an IT management)
  - Scalability to handle 100's of thousands of devices
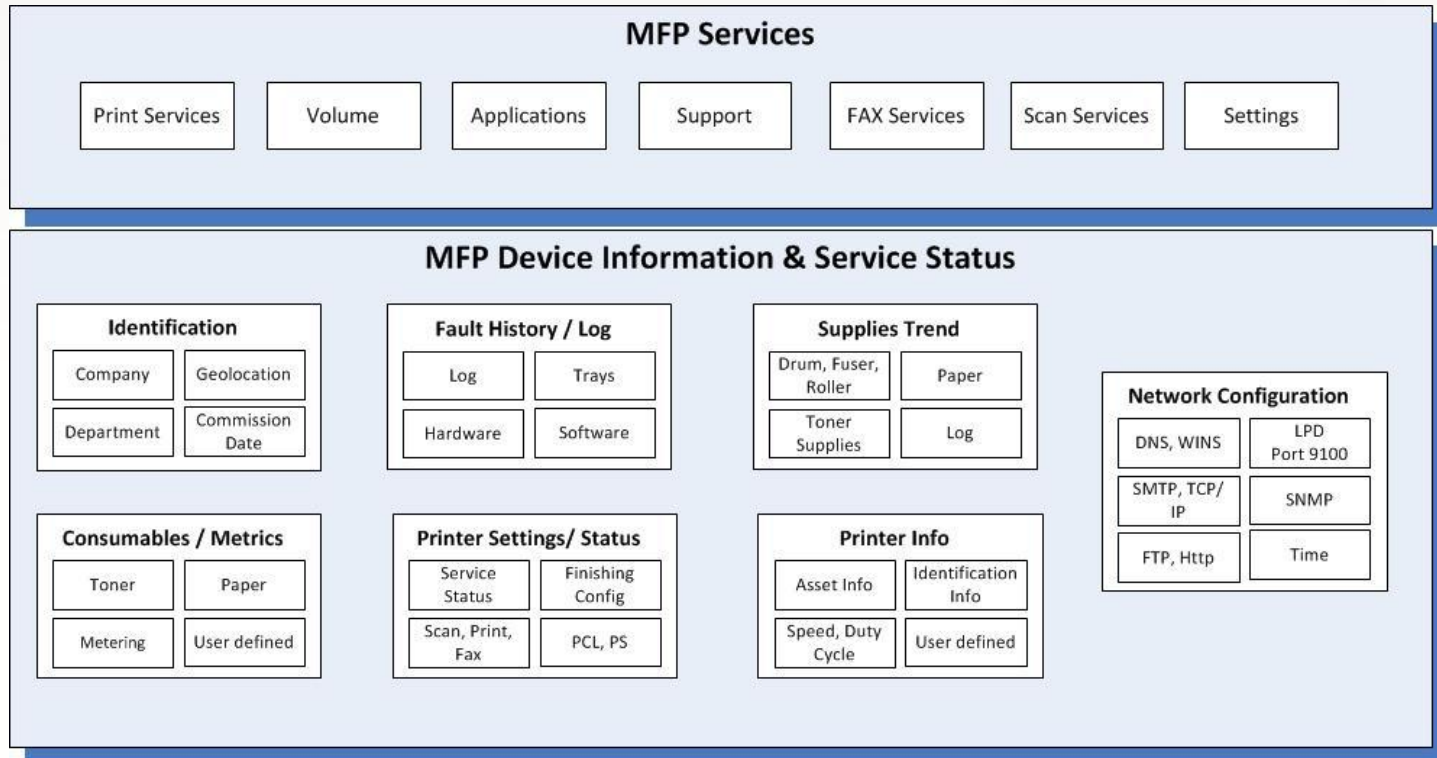 - Security

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PWG

Define a Standard MFP Data Model and Services templates (new TR numbers) to enable new Print Managed Services (similar to cable, telcomm industry) and business models for Printing Industry.

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Standard - Device/Services

CWMP applied to MFP (TR-***)

MFP Services

| Print Services | Volume | Applications | Support | FAX Services | Scan Services | Settings |

MFP Device Information & Service Status

Identification

| Company | Geolocation |
| Department | Commission Date |

Fault History / Log

| Log | Trays |
| Hardware | Software |

Supplies Trend

| Drum, Fuser, Roller | Paper |
| Toner Supplies | Log |

Network Configuration

DNS, WINS	LPD Port 9100
SMTP, TCP/IP	SNMP
FTP, Http	Time

Consumables / Metrics

| Toner | Paper |
| Metering | User defined |

Printer Settings/ Status

| Service Status | Finishing Config |
| Scan, Print, Fax | PCL, PS |

Printer Info

| Asset Info | Identification Info |
| Speed, Duty Cycle | User defined |

TR-*** = TR-106 + Extensions for the MFP

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CWMP Features

- Software and Firmware image management
  - Managing software and firmware downloading from a repository to the CPEs
    - Standard mechanism of identifying the firmware versions, initiating firmware download, and recording the result of a firmware download
    - Standard to ensure the integrity of the firmware to be downloaded through the use of a digital signature
      - HTTP/HTTPS or optionally FTP, SFTP, or TFTP

- Auto Configuration and dynamic service provisioning
  - Post firmware installation, server performs auto-configuration and to provision the CPE with services based on a variety of criteria
  - Provisioning might be done when a CPE initiates a connection to the broadband access network or when the CPE initiating the re-provisioning at any subsequent time.
  - Identification mechanism allows provisioning based on specific requirements of a CPE; group criteria such as vendor, model, software version, or other criteria

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CWMP Features (Cont.)

- **Status and performance monitoring**
  - Parameters can be standard ones (TR-098) and non-standard parameters (based on TR-106 + extensions)
    - Server observes the "DeviceSummary" to identify the device.
    - Device periodically notify the Server based on parameters in order to report its status
    - SNMP
      - Each vendor produces its own MIB.
      - CPEs from multiple vendors use different OID for the same purpose

- **Device diagnostics**
  - For troubleshooting purposes parameters such as connection status, service issues, etc.
  - CPE can send diagnostic info or server can read relevant parameters

- **Identity Management for Web Applications**
  - There is an optional mechanism for a CPE to allow customization of web-based application content to be accessed via the CPE's local network

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ACS – CWMP

CRM	Supply Chain	Billing	ERP	Service Management	Others

Apps

Northbound Interfaces – TR-131, ITIL

Industry Vertical Specific UI & Workflows

ACSService Layer

Rules Processing	Trouble Ticketing	Asset Tracking	Usage Profiling

ACS Core Layer

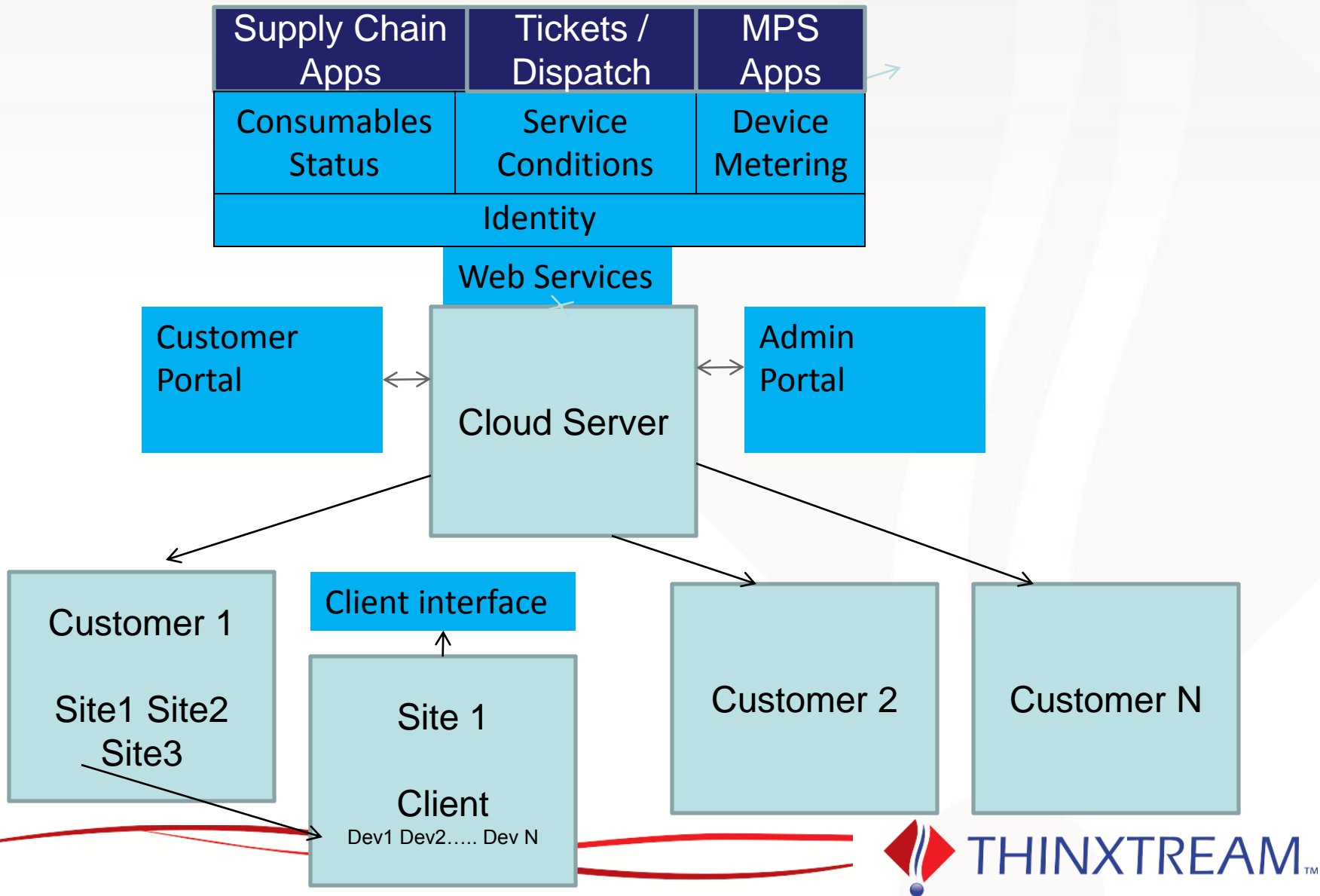| Discovery	Status Collection	Configuration	Upgrade	Reports
User Management	Scheduling	Alerts	Grouping	Licensing

Southbound Interfaces – TR-069

Proxy Client
– SNMP, HTTP/s, RS232, Application Bridges

Embedded TR-069 Client Devices

Integration Possibilities

Supply Chain Apps	Tickets / Dispatch	MPS Apps
Consumables Status	Service Conditions	Device Metering
Identity		

Web Services

Customer Portal ↔ Cloud Server ↔ Admin Portal

Customer 1

Site1 Site2 Site3

Client interface

Site 1

Client

Dev1 Dev2….. Dev N

Customer 2

Customer N

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Summary

- Addresses need for cross vendor platform management as part of Managed Print Services Strategy
- Gain Visibility of assets
  - Technical – versions, configs, locations, models..
  - Business – Usage Metrics, SLA, Compliance
- Scalability
  - Manage large fleet of distributed devices without increasing costs
- Secure channels of communication
- Enable new business models
  - Completely managed device – services turned enabled/disabled based on what customer pays for aka. Telco model or the iTunes model
  - Personalize through service customization
- Capture of Metrics – New Revenue Models and Business Intelligence
  - Cross charge, MPS/charge-per-usage, usage trend prediction..
- Improve customer experience
- Decrease support costs - Increase Productivity and Profitability
  - Remote Management, minimize truck rolls
  - Integrate with consumables/supplies, Support call workflows and applications
- Consolidation of applications
  - Multi-vendor/product support capability, Integrate with other cloud applications
  - Build a customized service solution that can address unique end-user needs in a rapid timeframe
- Standards based

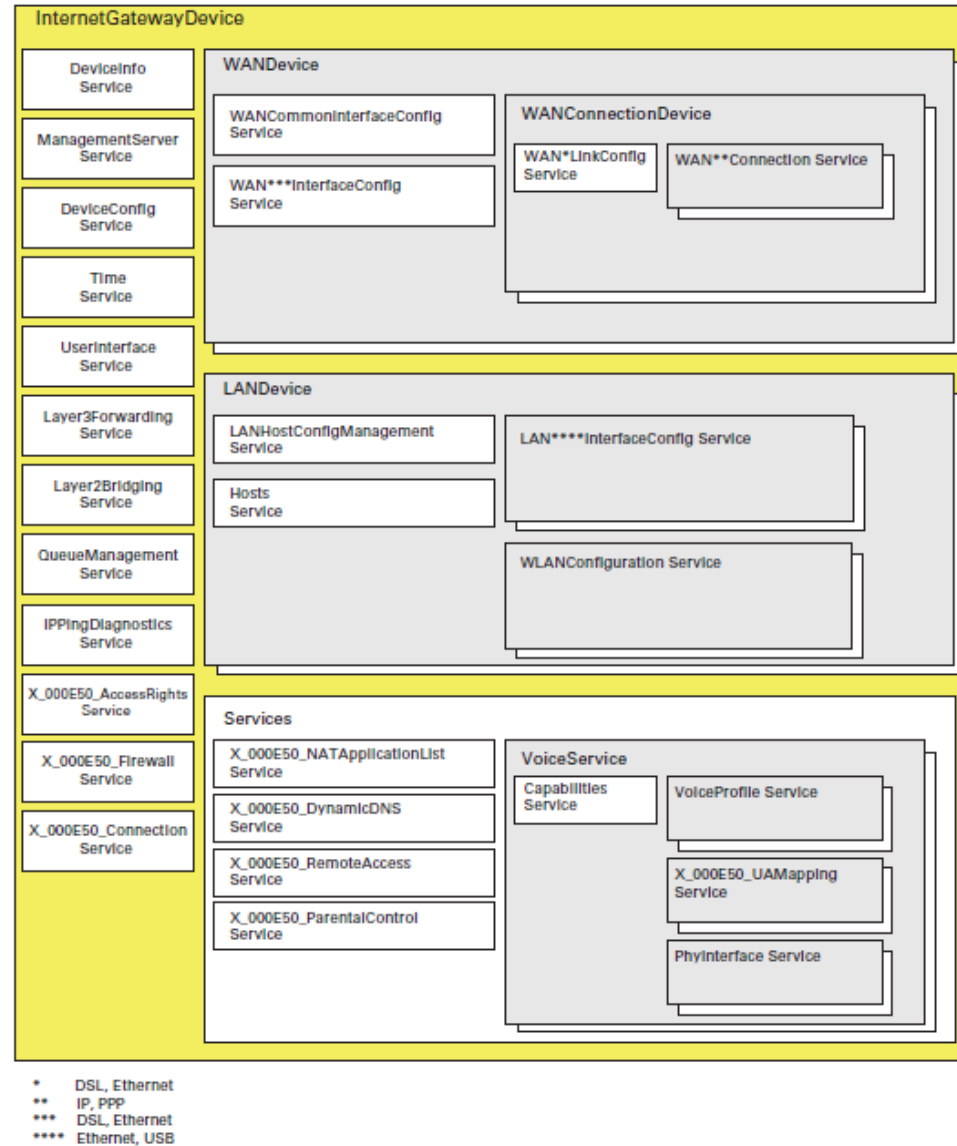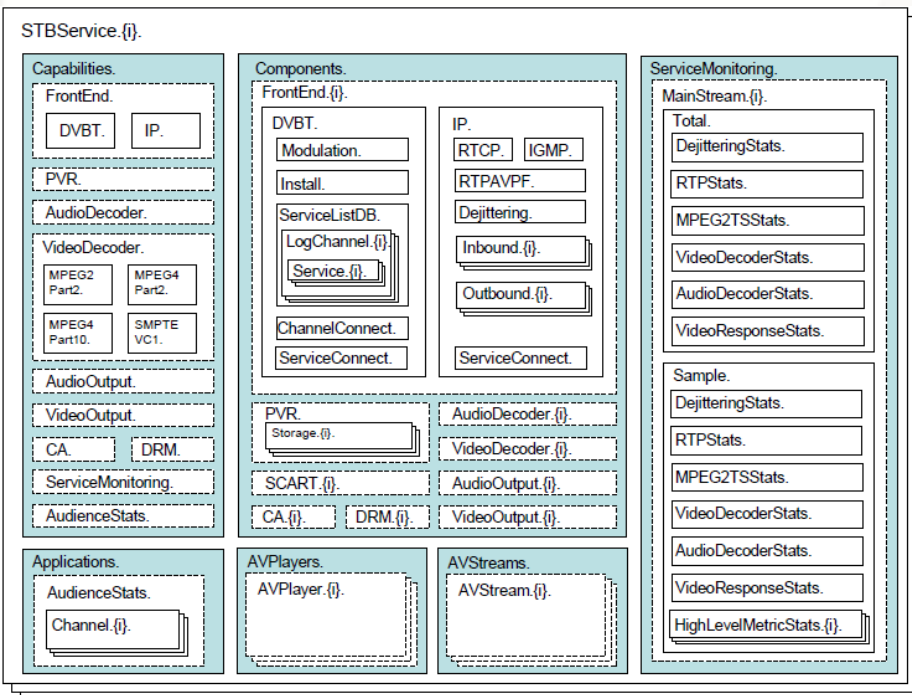THINXTREAM™

Backup

Others that are behind it

Connected Home Management
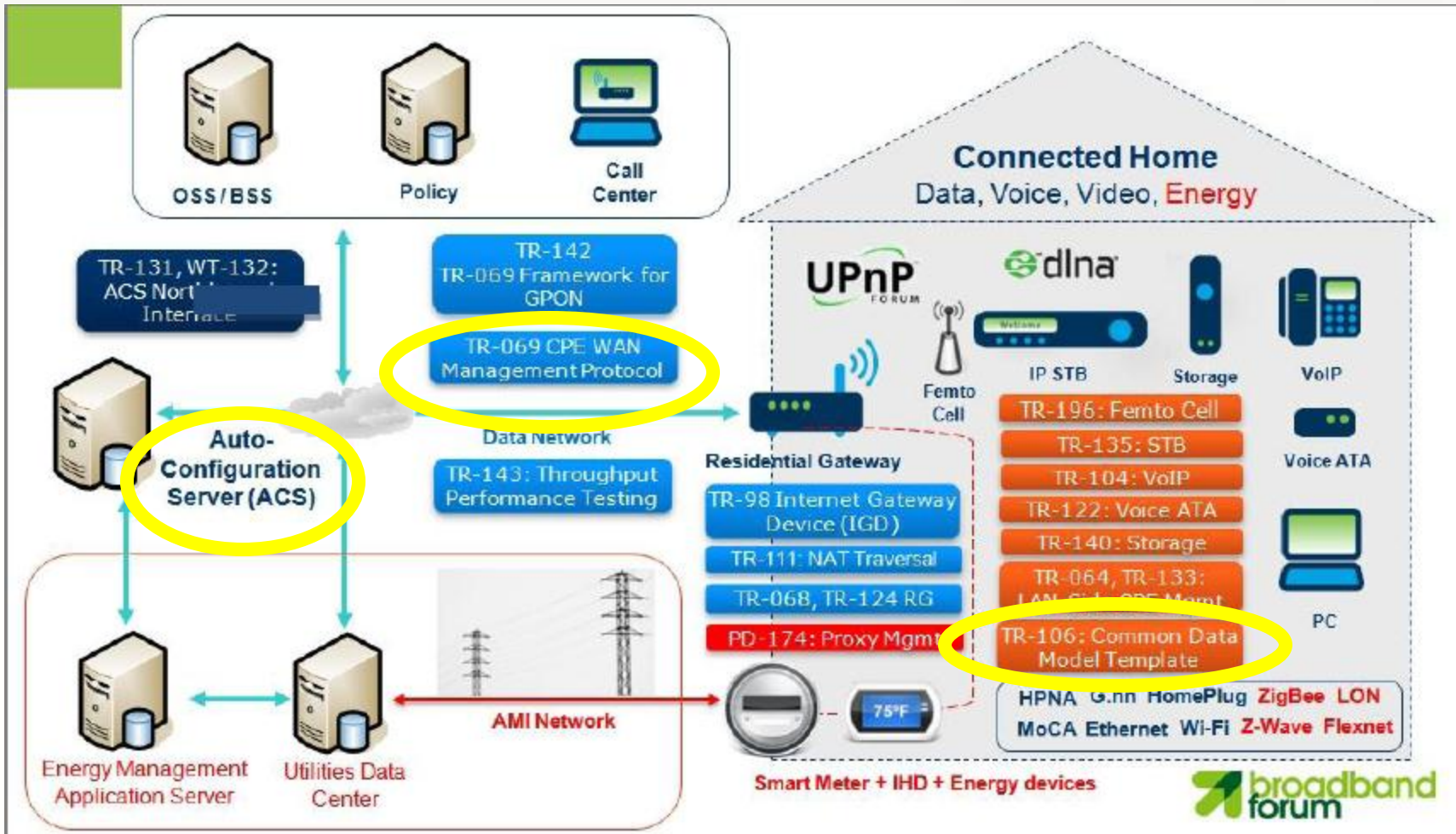
Examples

- IPSTB (TR-135)
- Internet Gateway (TR-098)

PrintingDevice

DeviceSummary

| Marker.i | MarkerSupplies.i |

| MediaPath.i | MarkerColorant.i |

| Input.i | Output.i |

| Cover.i |

Interpreter.i

| Channel.i | Interfaces.i |

Jobs.i

Alerts.i

DeviceInfo

| Identification Info | Type Info | FW/HW version | Processing Speed |

LAN

| IP Config | DNS | WINS | DHCP |

ManagementServer

| TR-069 | SNMP |

UserInterface

| FrontPanel | Console Lights | EWS |

Time

GatewayInfo

Config

| Email | FTP | Port9100 | LPD |

| Quality | Finishing | Fax | Copy | Scan | PCL | PS |

Controller

| Processor | Memory | Storage |

Example - Message Flow for Device Firmware Upgrade
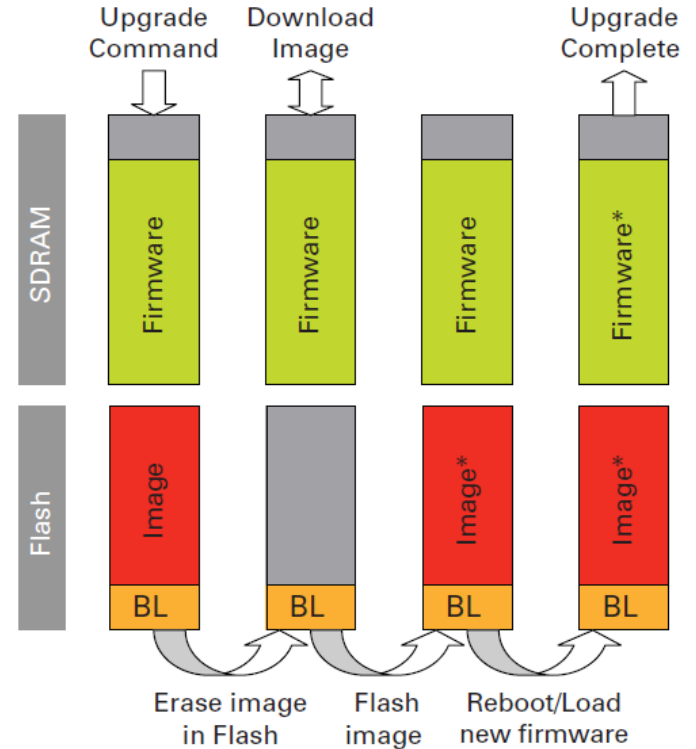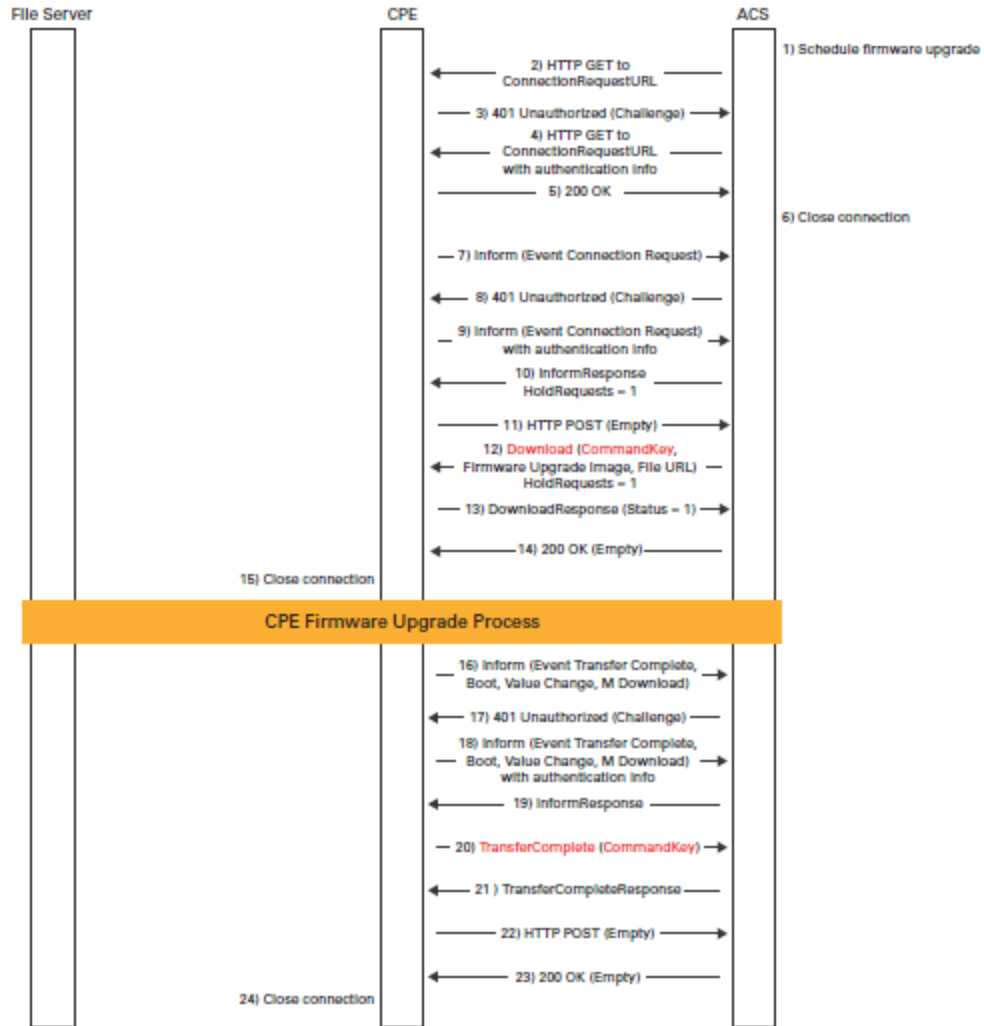
Information	SNMP	EWS	Access	Comments
Network configuration				
DNS and WINS Configuration	No	Yes	Read-write	
SMTP configuration	No	Yes	Read-write	
FTP configuration	No	Yes	Read-write	
HTTP configuration	No	Yes	Read-write	
LPD and Port 9100	No	Yes	Read-write	
SNMP configuration	No	Yes	Read-write	
Time configuration	No	Yes	Read-write	
TCP/IP configuration	Yes	No	Read-write	
Printing Settings				
Email alerts configuration	No	Yes	Read-write	
Finishing configuration	No	Yes	Read-write	This includes configuration of banner & separator sheets, Resource save, collation, blank pages etc
Scan, print, fax settings	No	Yes	Mixture of read and read-write	Darkness, Resolution Error and toner alarm switches, fax phone number etc
PCL settings	No	Yes	Read-write	Font, Duplex, paper size, orientation, draft mode, color mode etc
PS settings	No	Yes	Read-write	Error report flag, Timeout, paper select
Printer information				
Printer general, identification and asset information	Mostly Yes	Mostly no	Few are read-write	Asset info, identification info, printing speed, memory size, language
Consumables and paper usage				
Consumable status and estimates	Yes	No	Read	
Service	Yes	No	Read	Drum, fuser, roller information
Paper – Metering	Yes	No	Read	
Tray status	Yes	No	Read	
Printer interaction				
SNMP and EWS connection settings	No	Yes	Read-write	

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