

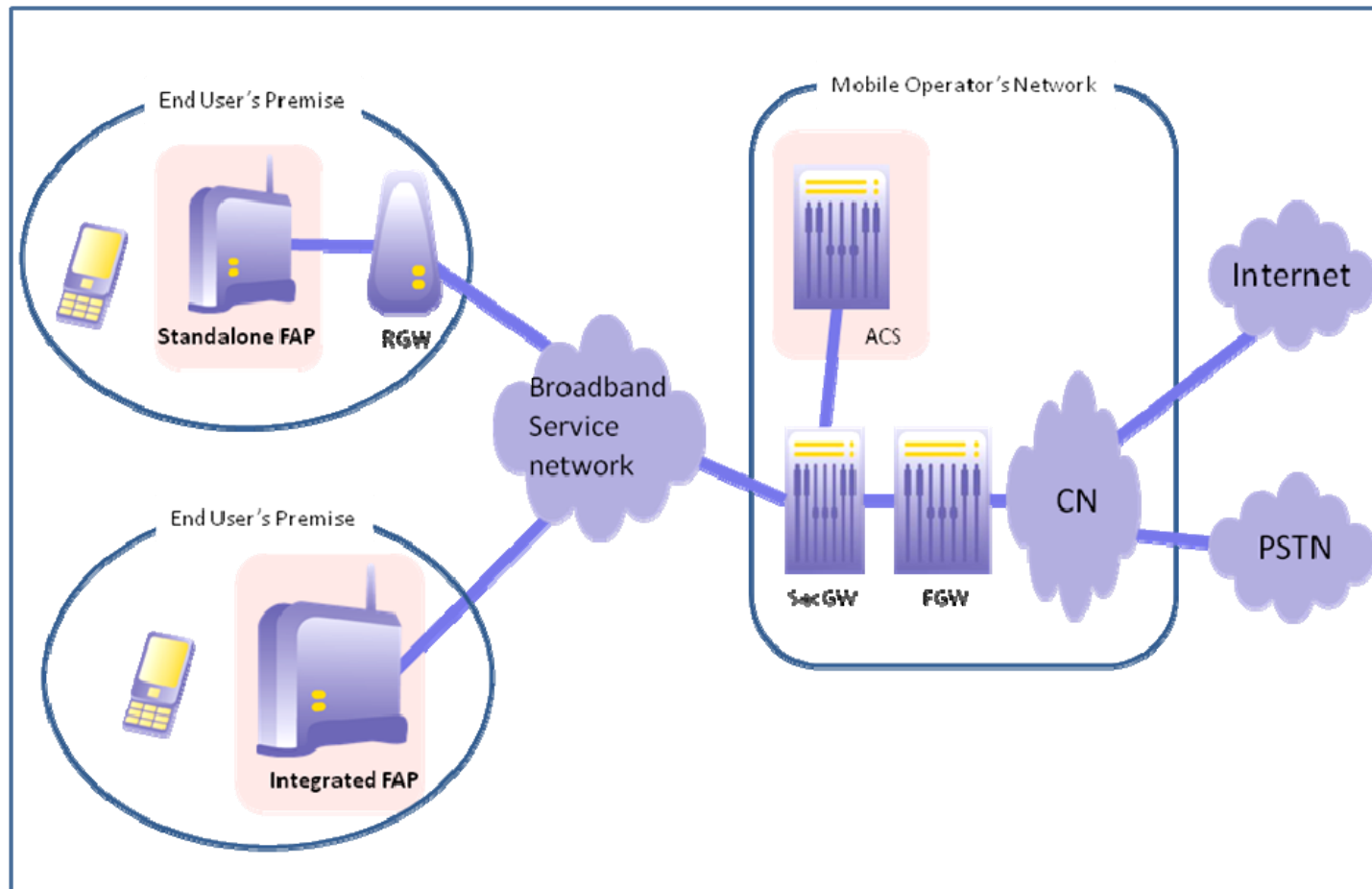
Extending TR-069 Management to Femtocell



What is Femtocell?

- Femto Access Point (FAP), or “Femtocell” in general, is a terminology for a new type of CPE device emerging in the mobile industry.
 - It is a small-scale cellular base station designed specifically for indoor coverage.
 - It communicates to the user’s mobile handset over the standard-based radio interface using licensed spectrum and further connects to the mobile network infrastructure over the fixed broadband connection.
- There are two types of FAP devices:
 - The standalone FAP is a device that is connected to a physically separate RGW via an Ethernet cable and
 - The integrated FAP is a device that has FAP and RGW functionalities combined into a single CPE device.

Overview of Femtocell System



Benefits of Femtocell

The notable benefits of femtocell include:

- Improving in-building signal coverage and quality
- Offloading the macro base stations from indoor users
- Introducing 3G coverage and service to users irrespective of the presence or absence of the 3G macrocell coverage in the surrounding area
- Enabling the introduction of traffic-intensive services that require high data rate
- Enabling the introduction of new “femtozone” applications and services

Femtocell Characteristics

There are several main characteristics that the femtocell separates itself from the traditional cellular network infrastructure as follows:

- It is a consumer CPE device that is located at the end-user's premise.
- The intended coverage and the capacity are orders of magnitude smaller than the traditional macrocells.
- The number of devices deployed and to be managed is orders of magnitude higher than the traditional macrocell based system.
- It uses the existing fixed broadband technology, such as xDSL, as the backhaul to the mobile network.

Unique issues

- The physical control of the device itself is outside the control of the mobile operator that provides the service.
 - This includes aspects such as the physical state and condition of the device itself, and the location of the device where it may be installed and operated.
- Since the number of devices to manage is order of magnitude higher than the traditional macrocells, different approach of device management may be required.
- Maintaining the same level of QoS and Grade of Service with the traditional macrocell based system present challenges to the mobile operators due to the fact that the tight control of the device is neither necessarily guaranteed nor possible.
 - Some of the constraints include the general nature of the existing fixed broadband technology (e.g. xDSL), and the general characteristics of the CPE device (e.g. absence of HW/SW support of redundancy and the concept of availability). This impacts the area such as real-time device operation, management and service availability.
- For mobile operators who provide the FAP service to end users, support and consideration for the multi-vendor interoperable consumer CPE product paradigm is an important aspect that needs to be taken into account for the successful FAP service deployment and acceptance in the market.

Why TR-069 is the right FAP Management Protocol?

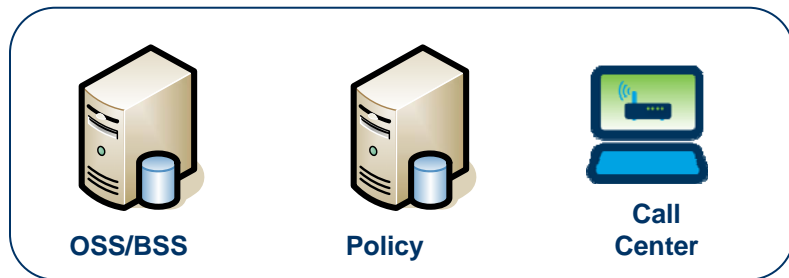
- The management of FAP requires a fundamentally different management approach from the traditional cellular infrastructure network elements.
- As the remote management protocol specifically designed for consumer CPE devices, TR-069 CWMP naturally fit the FAP remote management.
- Further, FAP management based on the standardized Data Model ensures interoperability across multiple vendors.
- This means:
 - From mobile operator perspective, it ensures easier and smoother OAM&P by reusing the technology that is already proven in the mass CPE deployment today.
 - From vendor perspective, it encourages and promotes the ecosystem across the whole femto industry, and
 - From the end user perspective, it allows simple and error-free “plug-and-play” installation.

Summary of TR-069 (CWMP) Benefits

- Profitable and seamless service deployment
 - Reduce costs
 - Enable services
 - Improve customer experience
- Higher layer protocol – network (and device) agnostic
- Robust functionality
 - Granular device and service control
 - Flexible, policy-based management
- Well-defined extensibility mechanisms
 - New devices and services
 - Vendor differentiation
- Standard web technologies
 - Scalable
 - Secure
 - Widespread
- Applicable to full range of devices on home network
 - Annexes F (device/gateway association) and G (NAT traversal)

BroadbandHome™

Remote Management Framework



WT-131, WT-132:
ACS Northbound
Interface

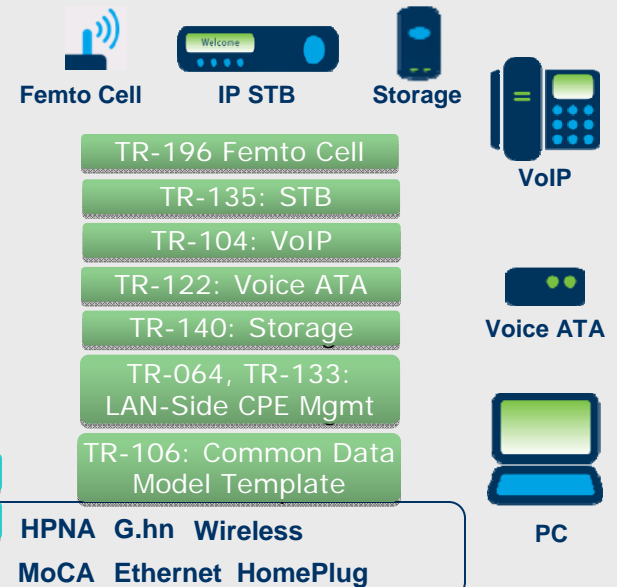
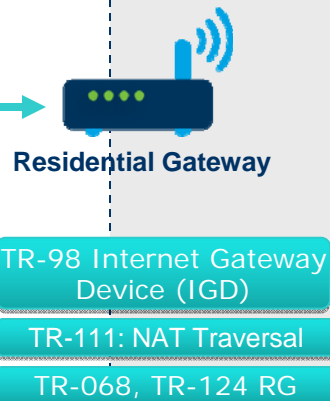


Auto-Configuration
Server
(ACS)

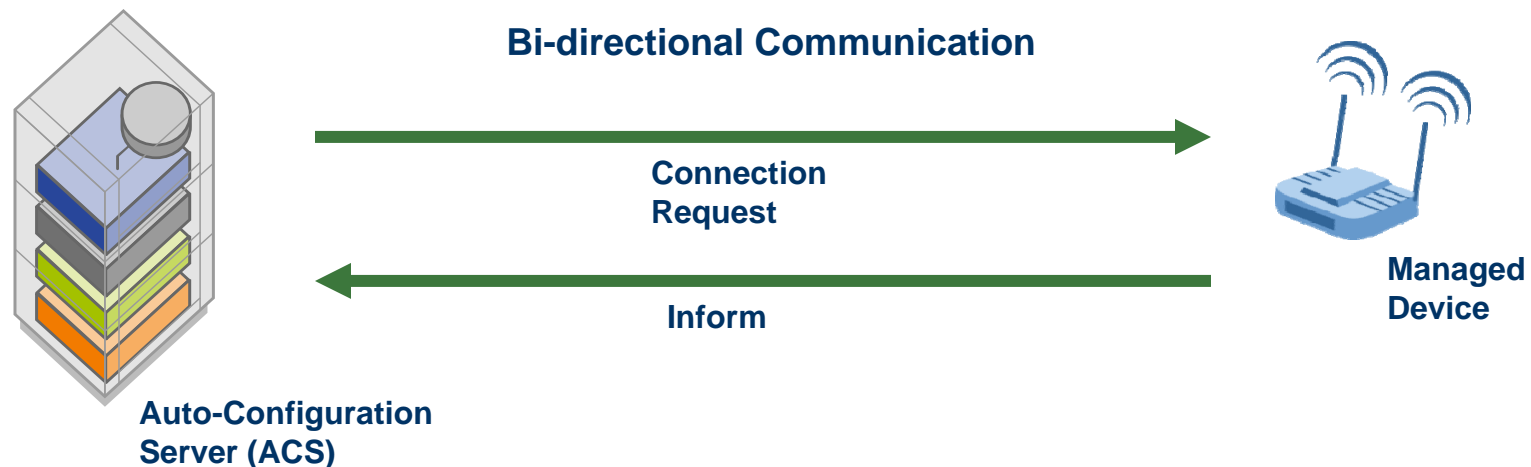
New! TR-142
TR-069 Framework for
PON

TR-069 CPE WAN
Management Protocol

New! TR-143:
Throughput
Performance Testing



TR-069: CWMP Protocol



ACS Discovery

CWMP Connection Initiation

- Bootstrap – first connect to network
- Requested by ACS – Scheduled or immediately
- Asynchronous Notifications
 - > Active – as soon as value changes
 - > Passive – report value next inform

Device Control

- Get, Set Parameter Values and Attributes
- Add, Delete Objects
- Reboot, Reset to Factory Defaults
- Initiate Firmware Download
- Initiate diagnostic tests

Applying CWMP (TR-069) to Home Network End Devices

- Interdependent TRs
 - TR-064: LAN-Side DSL CPE Configuration
 - TR-068: Base Requirements for an ADSL Modem with Routing
 - TR-104: VoIP Provisioning data model
 - TR-111: Applying TR-069 to Remote Management of Home Networking Devices
 - TR-135: STB Data Model supporting IPTV
 - TR-140: Storage Data Model
 - TR-143: Enabling Network Throughput Performance Tests and Statistical Monitoring
 - **NEW!** TR-196: Femto Access Point Service Data Model

New Work Supporting and/or Building on CWMP

- WT-123: TR-069 Conformance and Interoperability Test Plans
- WT-131: ACS Northbound Interface Requirements
- WT-148: CWMP Scalability Extensions
- WT-157: Component objects for CWMP
- PD-174: Management of Non TR-069 Devices
- PD-193: IPv6 Updates to TR-069 Related TRs
- PD-194: Software Module Management using TR-069
- PD-199: TR-069 Bulk Management

SDOs Using/referencing TR-069 CWMP for Service Provider Management

- 3GPP
- ATIS IIF
- DVB (Digital Video Broadcast) IPI
- ETSI TS 183065
- Femto Forum
- FSAN
- Home Gateway Initiative (HGI)
- ITU-T SG HN / IPTV
- Open IPTV Forum
- Universal Plug and Play (UPnP)
- WiMax Forum

**Need more information?
Check out [TR-196](#)**

