

## Cisco Connected Home Solutions Overview



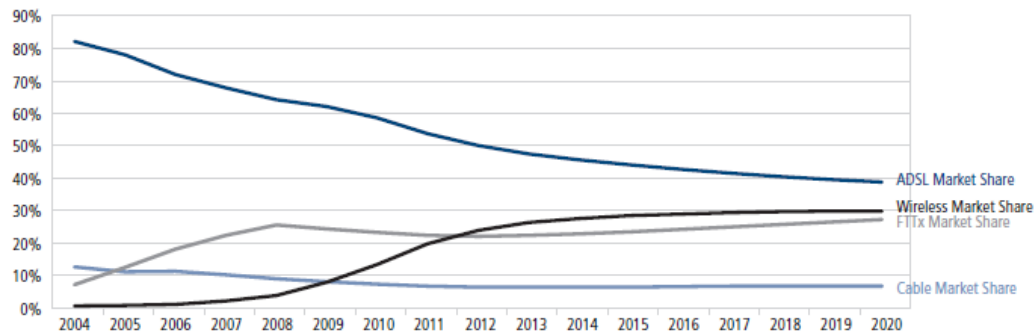
**Yongsub Lee**

**Solution Manger, APAC HQ Video Solution Group**

**February 2010**

# Broadband Market Dynamic

Asia Pacific Broadband Market Share Dynamics



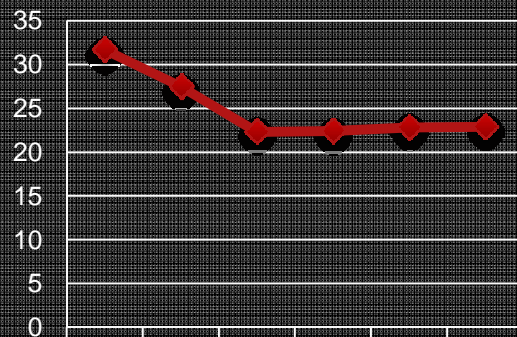
Source: MPA research estimates

- Fixed BB growth slower :
  - ~150% (2004) => 30% (2010)
  - Single digit growth since 2012
- BB ARPU is declining
  - \$31.7 (2004) => \$22.3 (2010)

## Broadband Internet Impact

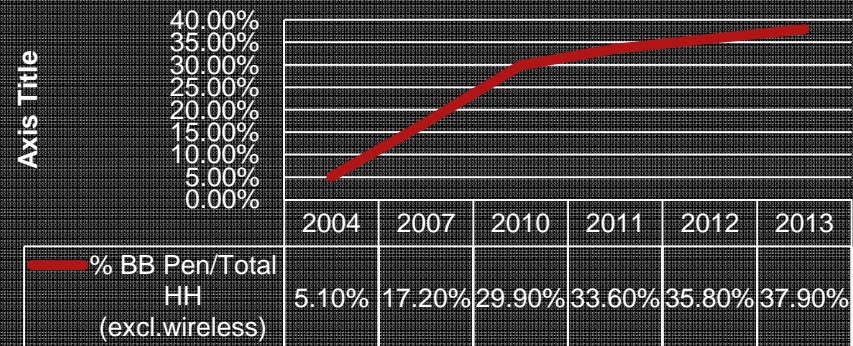
multimedia content in entertainment and communication  
 Passive recipients => active participants

## BB ARPU/Mo.(US\$)



Year	2004	2007	2010	2011	2012	2013
BB ARPU/Mo. (US\$)	31.7	27.5	22.3	22.4	22.8	22.9

## % BB Pen/Total HH (excl. wireless)



# Business Impact of Connected Home

- **Additional ARPU**

- Known revenue generators:**

- Landline Displacement – still good opportunity “out-of-region” (\$20-30 per month)

- Home Security – currently in 20% of US households (\$30-40 per month)

- New revenue generators:**

- Home Network Management – Geek Squad, ConneCTech... (\$10-15 per month)

- Home Monitoring & Automation – expand home security functions & add energy management (\$5-10 per month)

- Key service differentiators:**

- Personal Content Sharing/Access – better tie-in with consumer devices (e.g., Flip camera, tablets, media servers...)

- **Reduce OPEX While Offering New Services**

- Better tools** : self-install, diagnose connections and self-help services

- Lesser Support calls**

- Offload PDA/Smartphone traffic** (a la Femtocell model)

- **Increase Customer Satisfaction / Reduce Churn**

- Better phone coverage/quality** in the home : by femtocell AP

- Faster mobile data connection speeds** in the home : by femtocell AP

- Simpler connecting/configuring** the home networks

# Managed Services Revenue Opportunity

## ■ Current Service Model

### *Monthly Revenues*

Local Voice (1 line)	\$10
LD Voice (1 line)	\$20
<u>BB connection</u>	<u>\$30</u>

*Total \$60*



## ■ Next-Gen Broadband Service Model

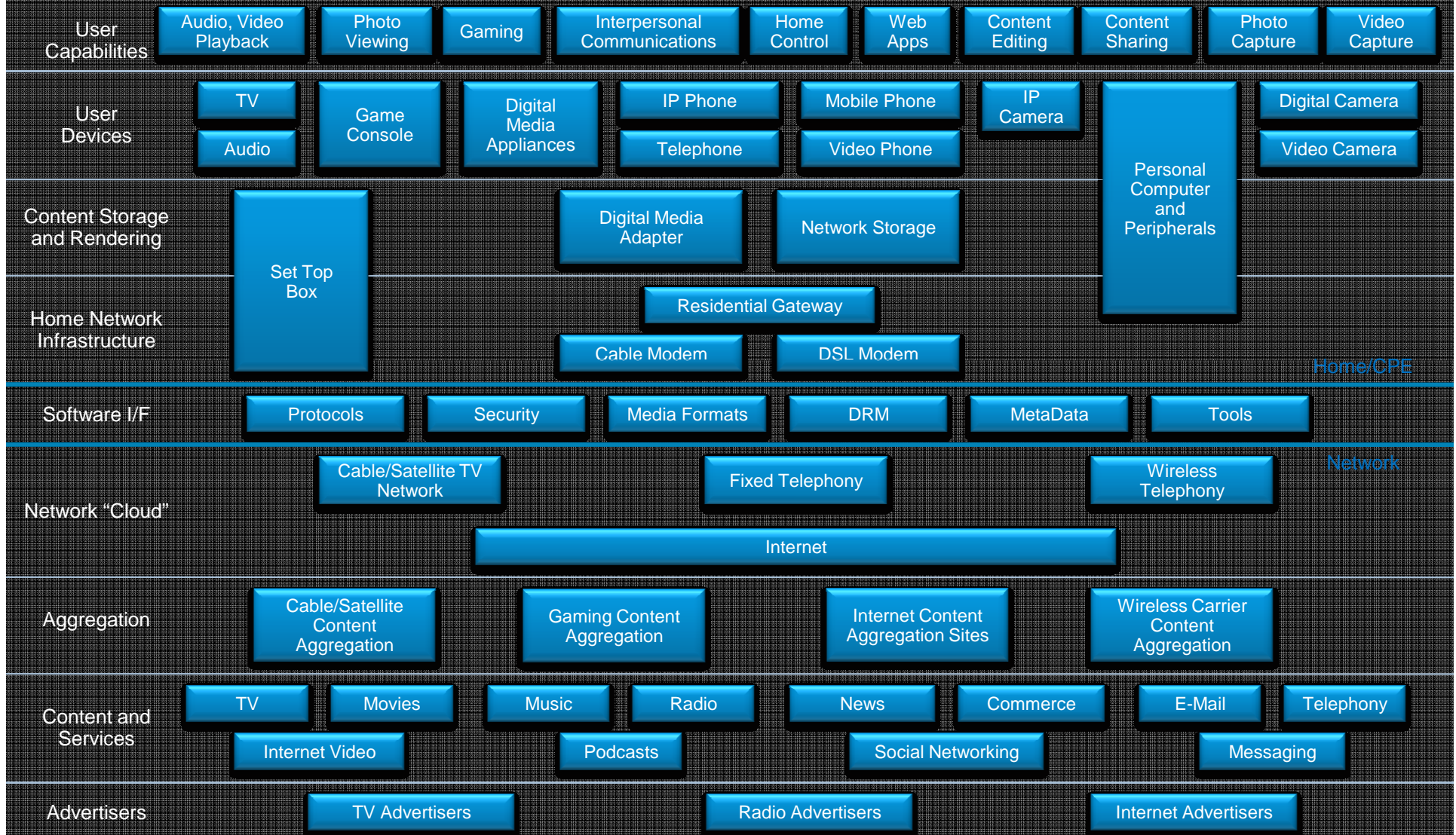
### *Monthly Revenues*

• BB connection	\$30
• Home Automation	\$10
• Home Security	\$40
• Network Mgt/Maint.	\$10
• Local Voice (1 line)	\$10
• LD Voice (1 line)	\$10
• <u>Home coverage FMC</u>	<u>\$10</u>

*Total \$120*



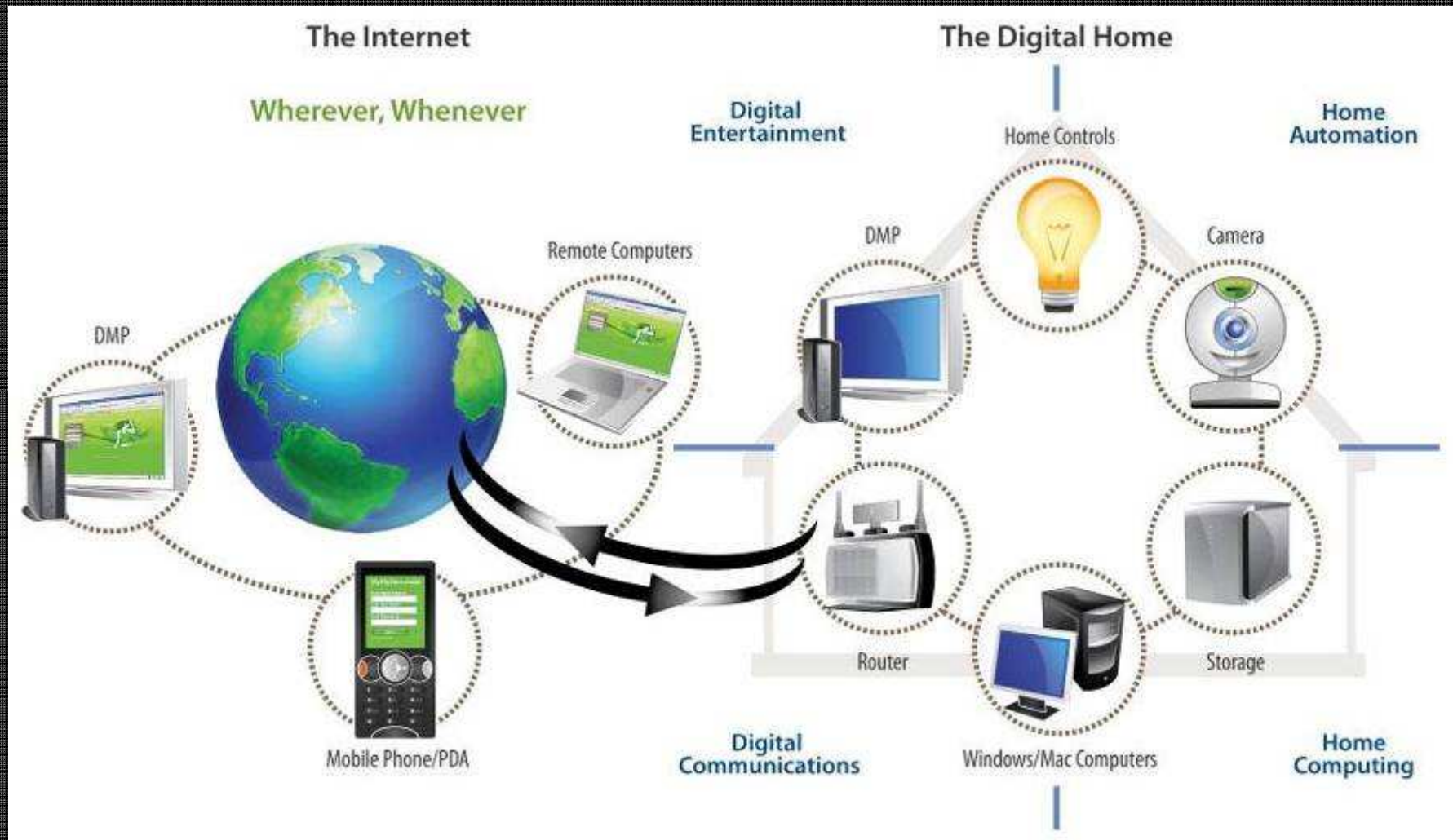
# Basically, We Are Distilling This.....



Home/CPE

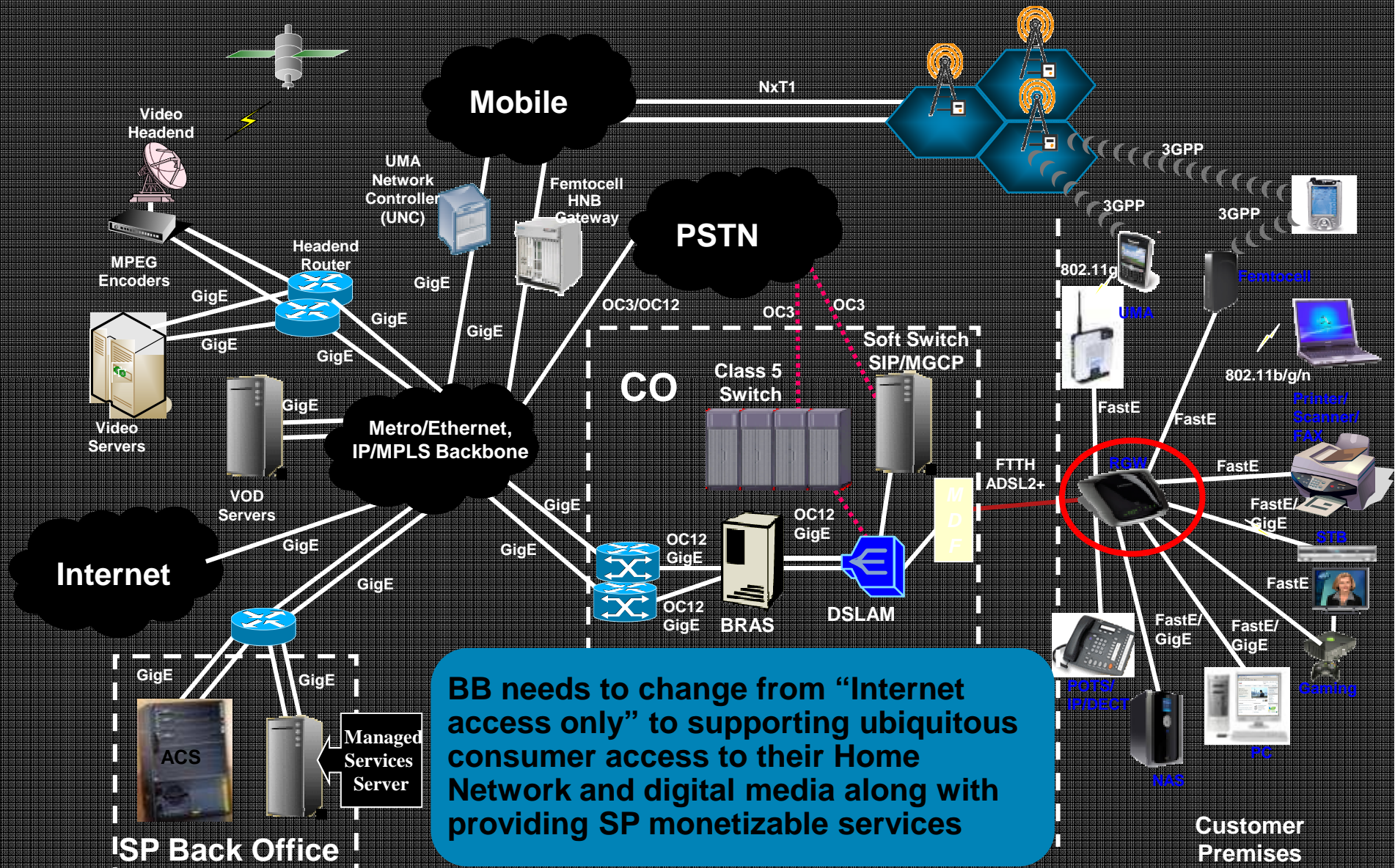
Network

# .....Into This



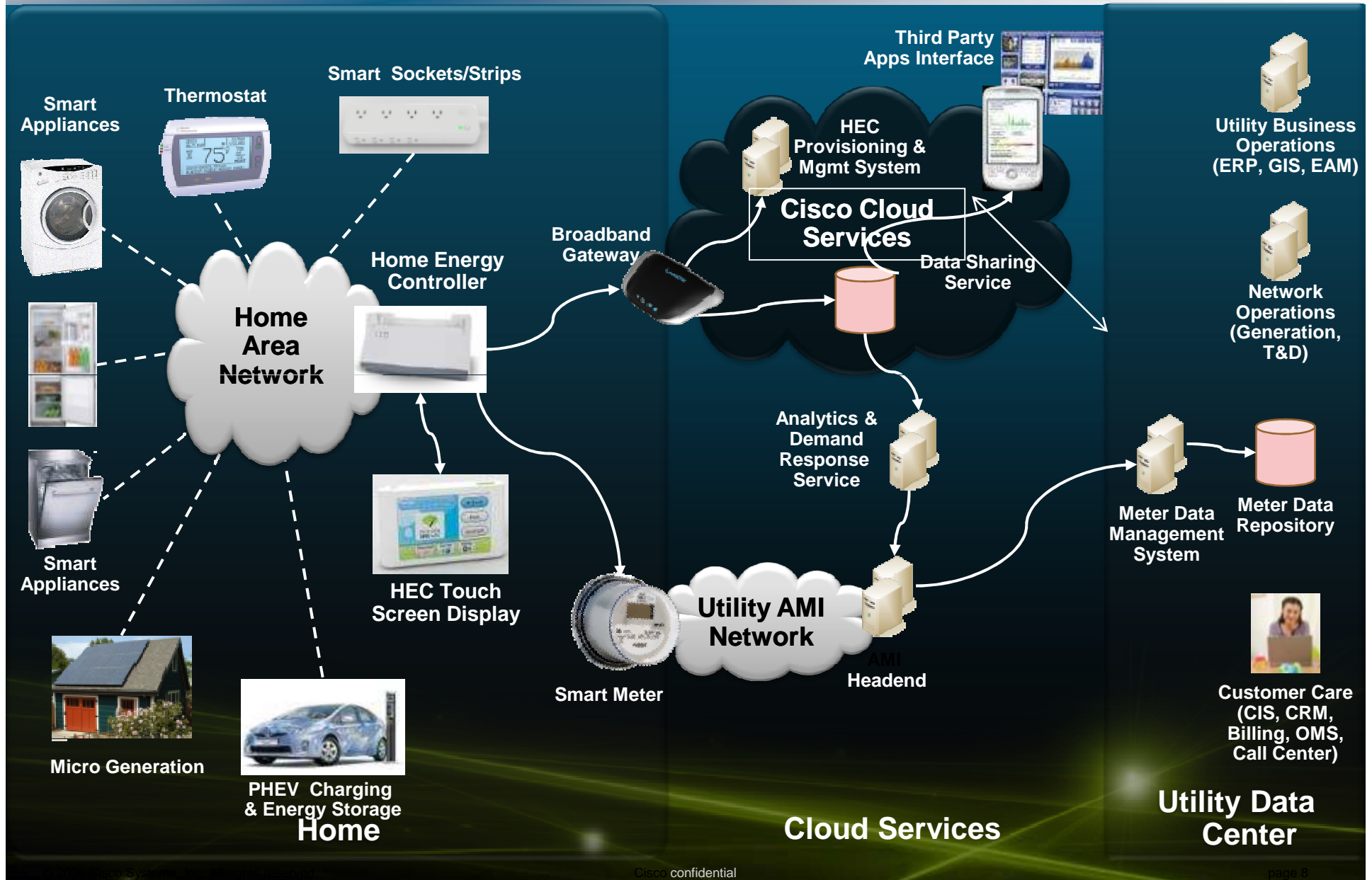
•Cisco IP NGN extends network services into the Home

# IP Network and Broadband Services



**BB needs to change from "Internet access only" to supporting ubiquitous consumer access to their Home Network and digital media along with providing SP monetizable services**

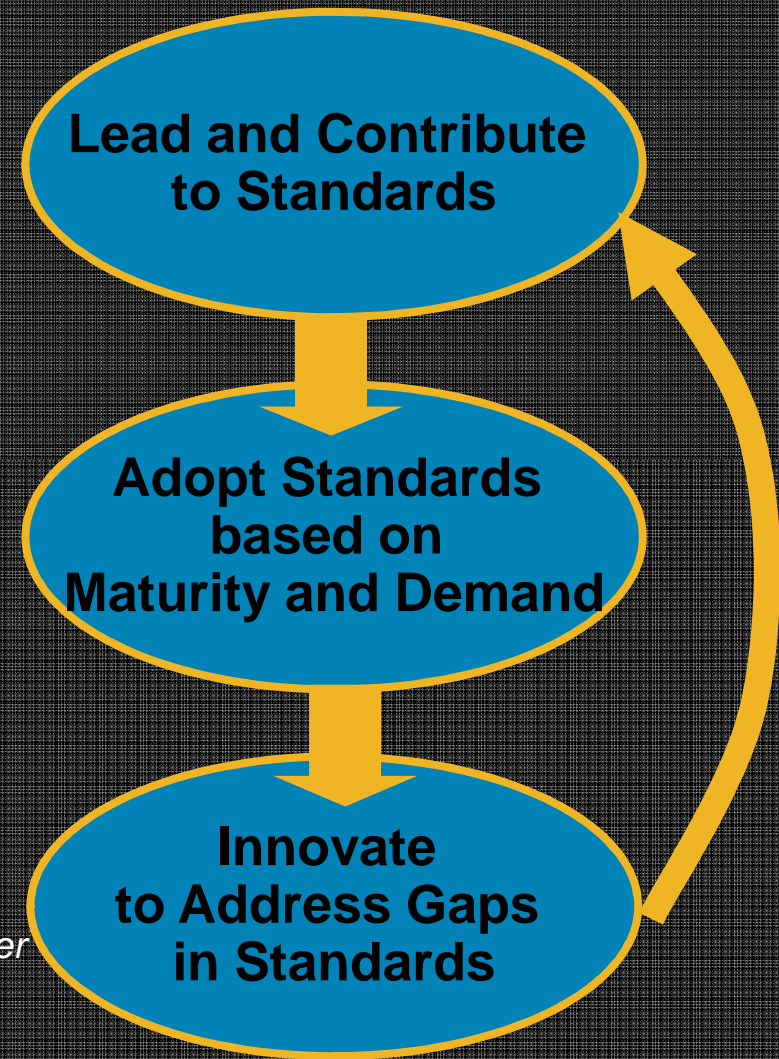
# Cisco Home Energy Controller High Level Solution Architecture





# Building the Connected Home on Standards

## Connected Home Architecture



- WiFi Alliance, Chair, Board of Directors
- MoCA, Board Member
- DSL Forum, Board Member
- Home Plug Alliance, Board Member
- CableLabs, Member
- UPnP, Member
- DLNA, Member



## Residential Gateways



**Key driver of Connected Home**



# Cisco Connected Home Networks Overview



Our Goal: Enable Multiple Service Types to Attach to Multiple Access Technologies

# Telco Home Networks *Solutions Portfolio*

## Residential Gateways

## Video Bridges



## Femtocells

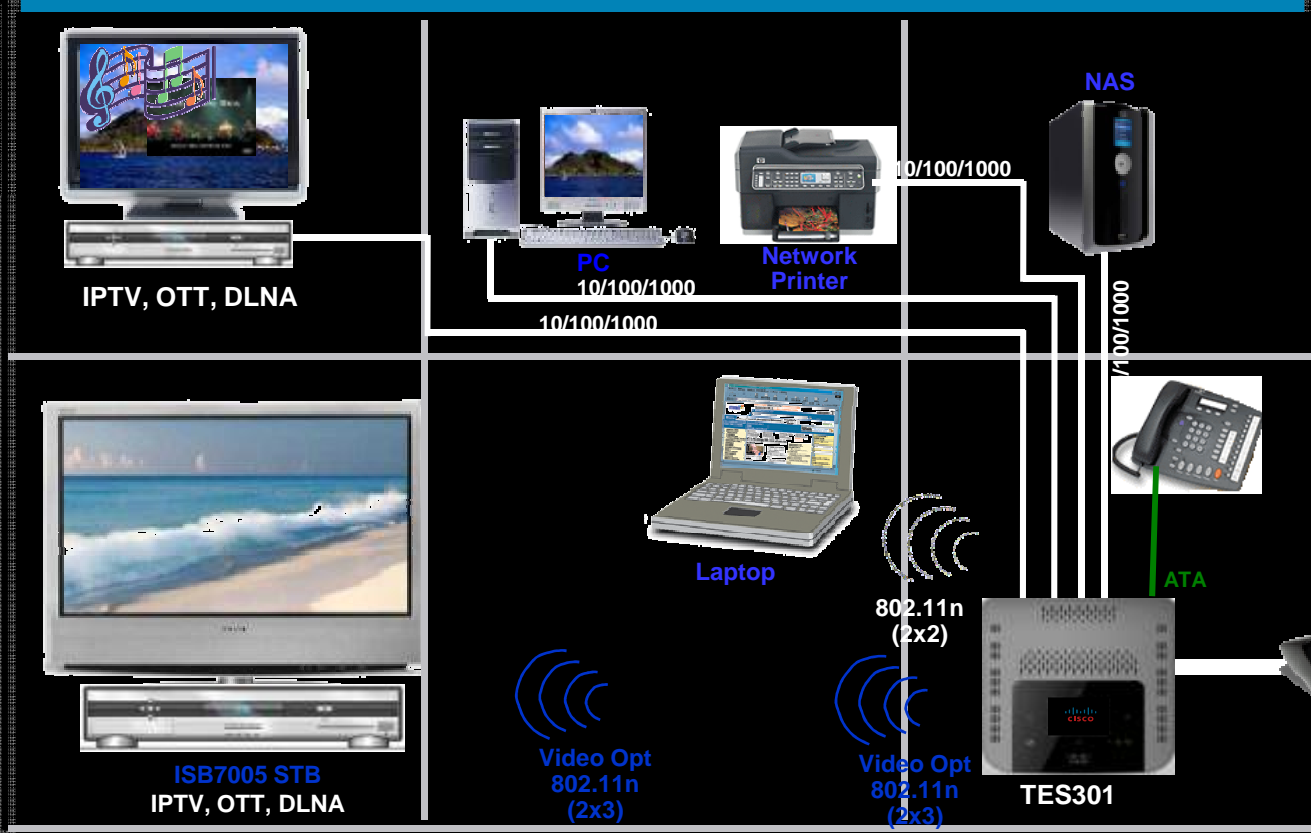


# Use Cases for the TES301

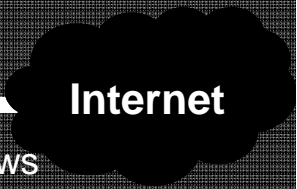
- **Owning and Simplifying the Connected Home**
  - Easy to use and follow **color LCD** combined with **Network Magic** to simplify connections, configurations & settings of IP devices in the home
  - Supports remote management, proactive monitoring and software updates
  - Supports secure WAN tunnels for private/protected personal data flows
- **Personal Content Sharing and Storage**
  - Intelligent and local caching on the TES301 (digital photos, music, video and data)
  - DLNA support to provide a consolidated view of all content within the home network (NAS, PCs, etc.)
- **Providing Phone Services**
  - Land Line displacement (two ATA ports)
  - Improved Coverage via FMC
- **Wireless Services**
  - Wi-Fi b/g/n (2x2) with up to 160 mbps service
  - Unscheduled Automatic Power Save Delivery (UAPSD) Cell phone handoff (UMA and SIP/IMS)
  - Video Optimized Wi-Fi (option) for connection with STBs
- **Home Security, Monitoring and Automation**
  - Managed Services (OSGI/JVM, iControl, 4-Home, Open Peak, etc.)

# Owning and Simplifying the Connected Home

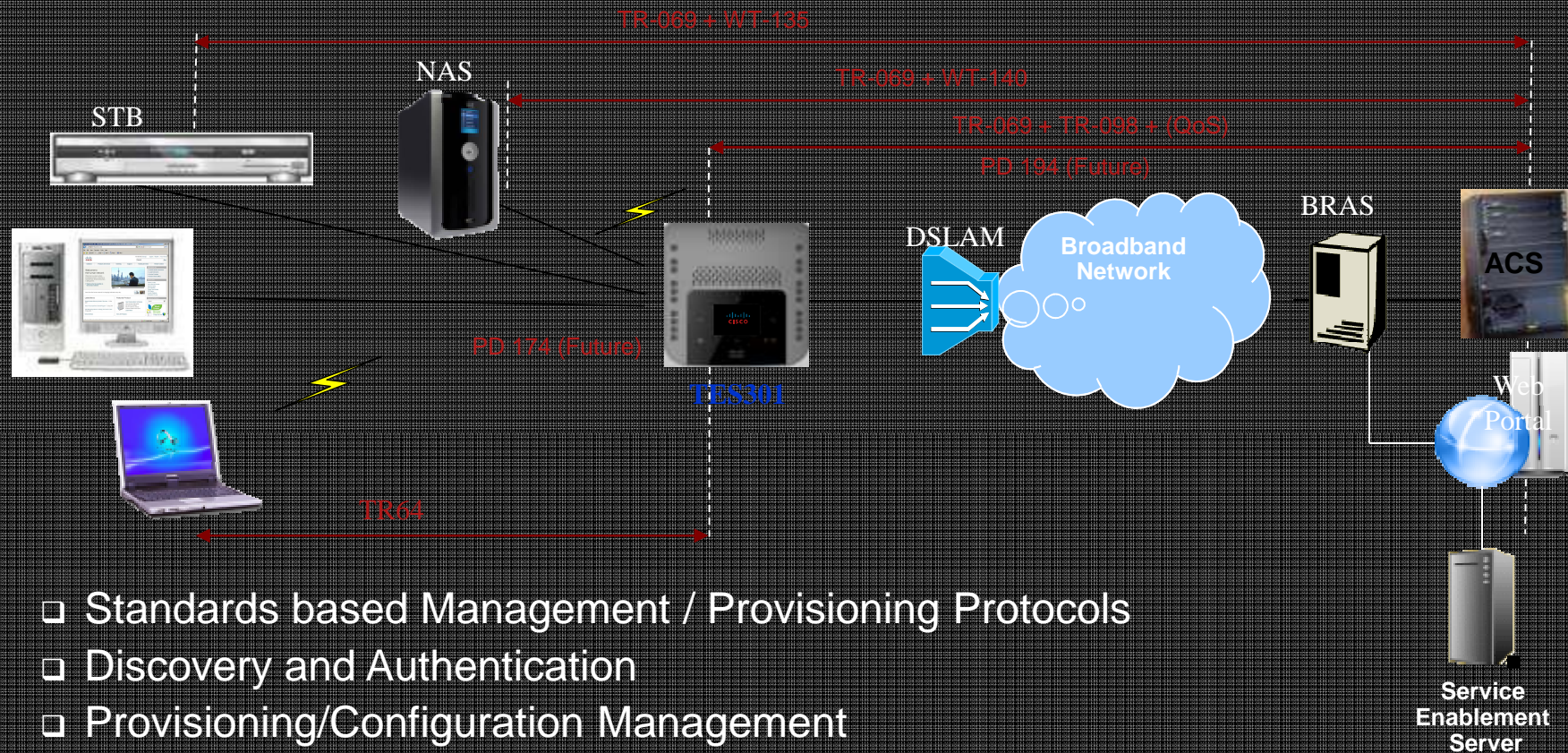
HOME



- Physical connections/
  - IP Subnets
  - Static IPs (e.g. print server)
- Wi-Fi N connections
  - SSIDs,
  - Security/Password settings
- VoIP setting
  - SIP or SIP/IMS phone #s
  - SIP Server URL
  - SIP registration
- PC settings
  - Anti-virus
  - Firewall
- Secure Flows
  - IPSec
  - DTCP-IP



# Gateway Management / Provisioning Protocols



- ❑ Standards based Management / Provisioning Protocols
- ❑ Discovery and Authentication
- ❑ Provisioning/Configuration Management
- ❑ Firmware/software upgrade management
- ❑ Performance management & diagnostics
- ❑ Entire home network management
- ❑ Provides OSGI and JVM management for Up-sale apps (e.g. iControl)



# New Services Require Customer Care

*Key to managing Opex!*

LELA/  
Network  
Magic



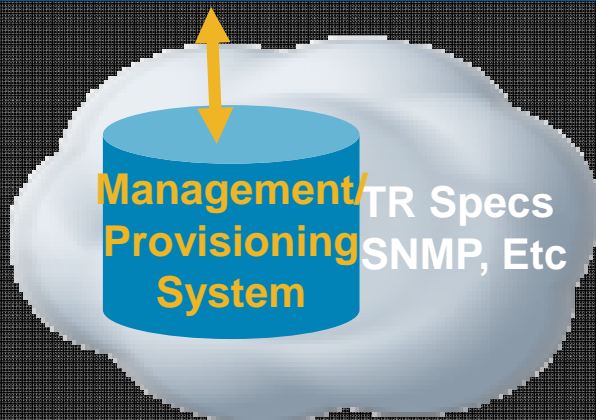
*Set Up Experience Post-Install Self-Care*

- ❑ LELA/Network Magic reduces number and duration of support calls
- ❑ Improves overall customer satisfaction
- ❑ Based on analyzing tens of thousands of calls a day, and supporting installed base of ~60M routers.

Home  
Network  
Devices



SP Gateway



SP  
HELP  
DESK



# Key Technology Component

## Cisco TR-069 Remote Management Software



Mature, well  
designed and tested

- Design and implementation started in 2005.
- 100% Cisco IP

Field Proven

- Interoperate with multiple ACS vendors (e.g. Motive, Cisco BAC, Clear Access)
- Deployed in the field on several different products, such as DSL RG, STB, Femtocell HS.

Dedicated  
Development Team

- The same team developed TR-069 stack has been maintaining and continues to evolve the stack.
- Experienced developers implemented different TRs and extensions: TR-098, TR-064, TR-111, TR-106, TR-104, TR-135,...

# Key Technology Component

## UPnP/DLNA Media Support



- DLNA *TwonkyMedia* manager with extensions

DLNA 1.5 compliant for media control and delivery along with QoS enhancements

UPnP for baseline in home discovery / control

Media Optimized Networking

Supports popular Media transports including IP/UDP/RTP/MPEG2TS

**Interoperable with popular devices and apps:** Xbox360, Flickr, iTunes, Internet Radio, Photoshop, etc.



- Cisco's Products and DLNA

Resident on the NAS and NMH product lines

Supported by Consumer-based Cisco Routers

WRT160N

WRT300N

WRT330N

WRT350N

WAG358N

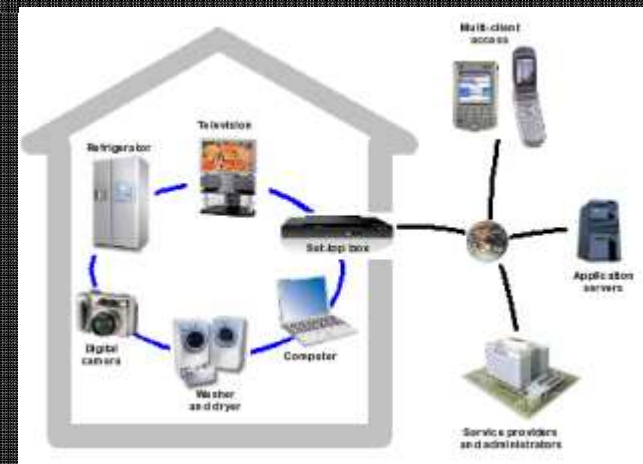
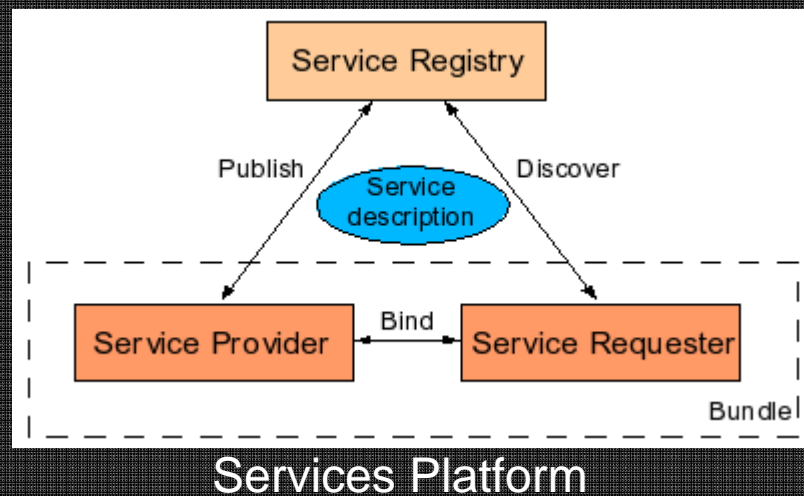


# Key Technology Component

## OSGi/JVM Applications Platform

The *Open Services Gateway Initiative* is an independent, non-profit corporation working to define and promote open specifications for the delivery of managed services to networked environments, such as homes and automobiles. These specifications define the OSGi Services Platform, which consists of two pieces:

1. OSGi framework (which sits on top of a Java virtual machine and is the execution environment)
2. Standard service definitions



Enables 3<sup>rd</sup> party applications

# Key Technology Component

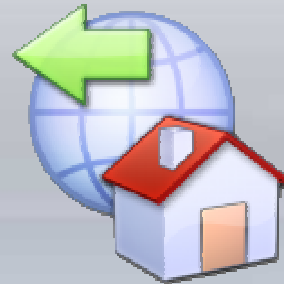
## *Network Magic - Home Network Management*



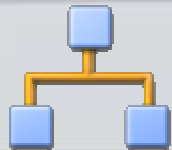
Device Setup  
(Setup  
Wizard)



Network  
Magic



Support  
Services  
and CSR  
Tools



Network Application SDK

- Setup wizard gets the device on the network. It is used one time.
- Network Magic is PC based application that maintains the network (repairs connections, secures, facilitates sharing).
- CSR Tool is a web interface into a CSR database that is updated periodically from the home. The database includes a record of the devices and events that have occurred on the users network since last update.
- Application SDK underlies all solutions. This is used to develop customized Network Management applications.



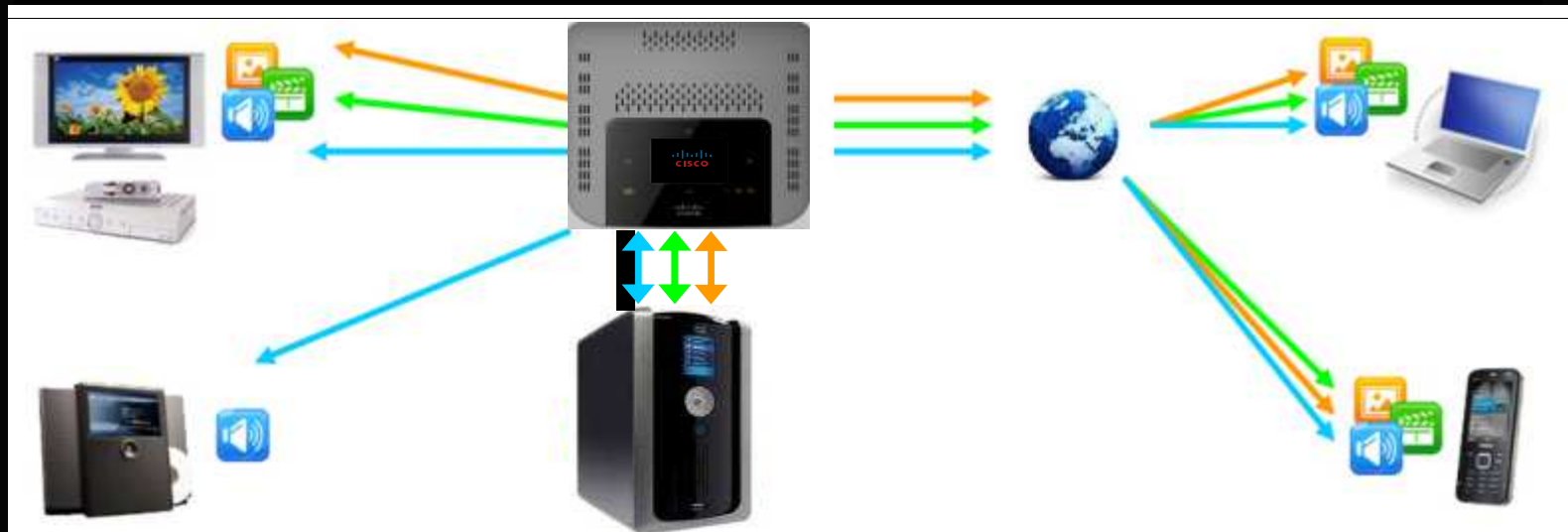
# Personal Content Sharing and Storage



- Virtualized view of digital photos, music, video, and Data
    - Consolidated view of all content within the home network (NAS, PCs, etc.)
    - DLNA *TwonkyMedia Manager* with extensions
    - DLNA 1.5 compliant for media control and delivery along with QoS enhancements
    - UPnP for baseline for in-home discovery / control
    - Powerful meta-data based view into aggregated content
    - Supports local and remote access with the same interface
    - Interoperable with popular devices and apps: Xbox360, Flickr, iTunes, Internet Radio, Photoshop, etc.
- Supports Direct connect to Flip camera for display on DLNA-supported TV

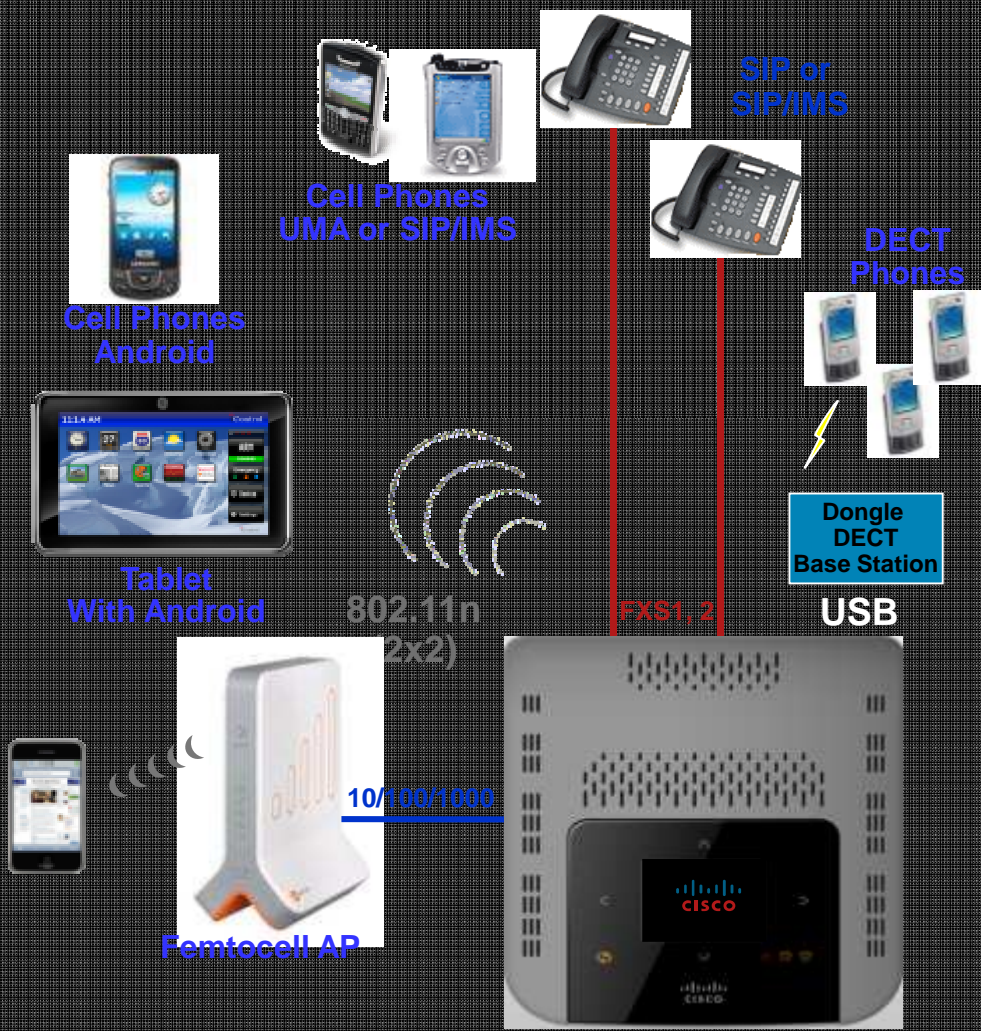
# Content Virtualization

- Crawl and index Media Content from devices via DLNA on the LAN
- Serve aggregated content to devices on the LAN or WAN using local and Remote Access





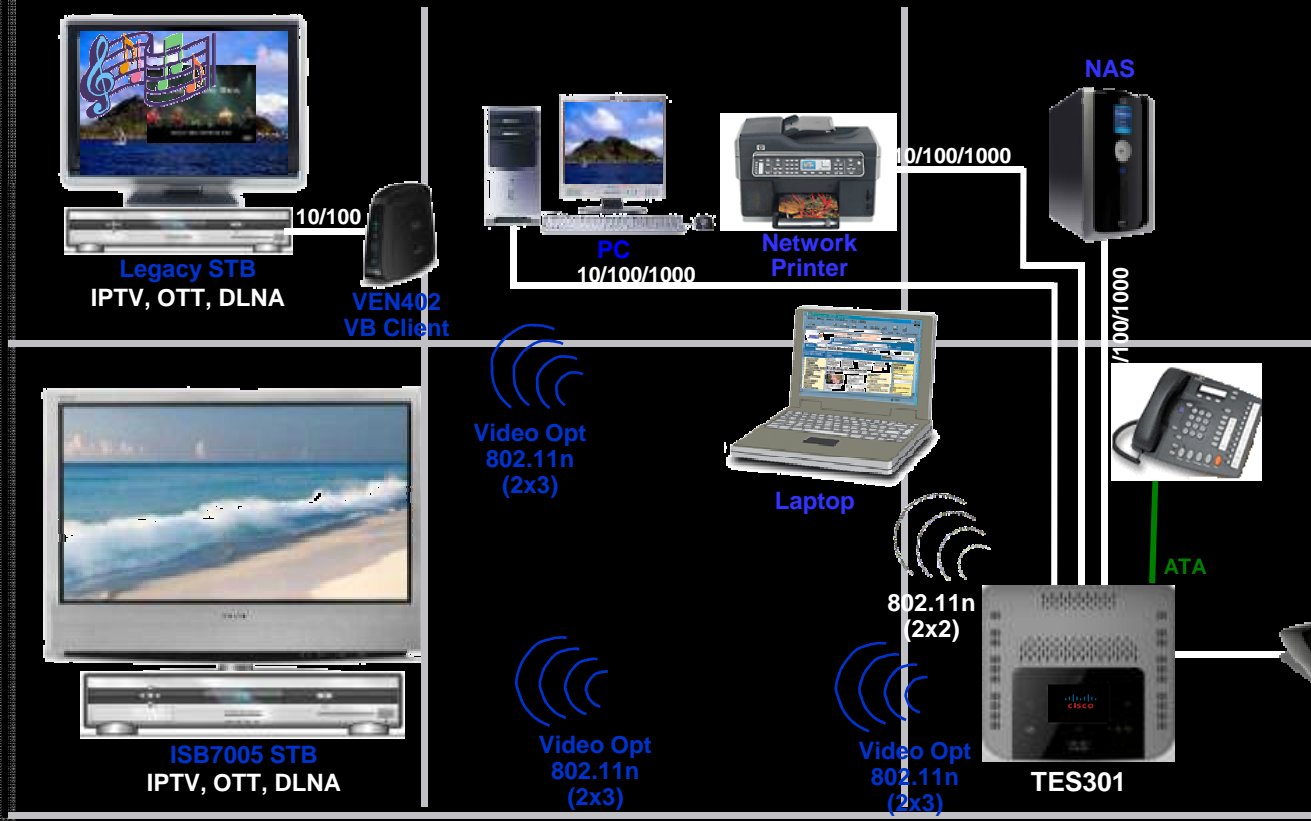
# Phone Service Options



- DECT Phone via USB Base Station dongle
- 2 Ports ATA
  - Separate SIP phone #s
  - SIP/IMS option
  - ISIM option for Auth/ID Mgt
- Home coverage
  - Wi-Fi-based UMA or SIP/IMS phones
  - Wi-Fi connection w/Android
  - Femtocell outboard for GSM
- VoIP Optimized WI-Fi N
  - UAPSD power save mode for UMA and SIP/IMS services
  - WAN upstream BW reservation for Voice

# Wi-Fi Connections in the Home

HOME



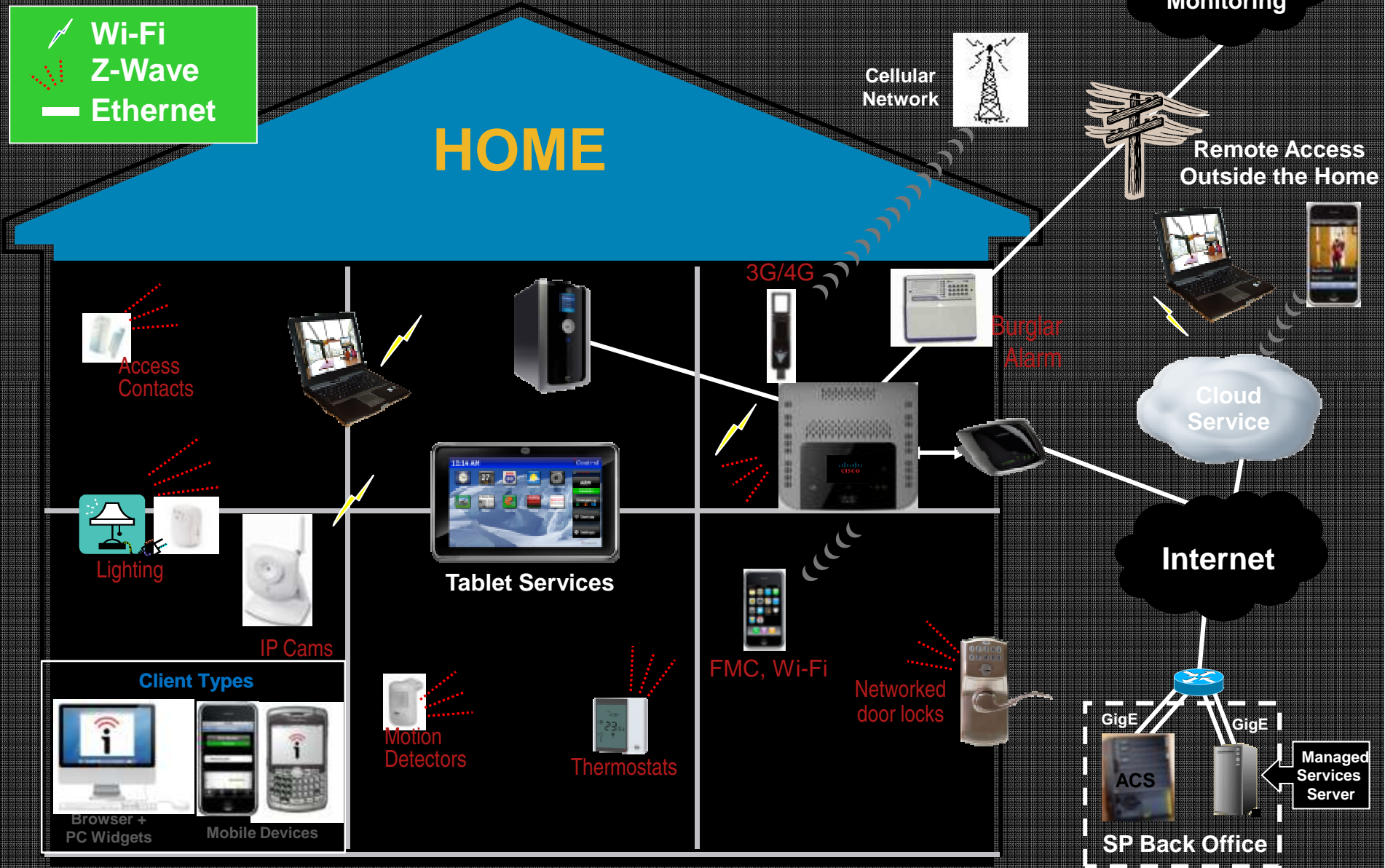
- Home Networking Wi-Fi N (2x2)
  - Up to 160 Mbps
- Video Optimized Wi-Fi N (2x3)
  - Up to 40 Mbps @ 150 feet

# SP Managed Services Opportunities

- **With Broadband connections nearing 75%, SPs need to find new ways to Increase ARPU**
  - Land line SPs need to offset growing infrastructure costs with additional BB-based revenue generating services
  - Wireless SPs need to offset FMC AP costs with revenue generating services
- **New SP services in the home will require the SP to provide IT and installation services to the consumer.**
  - Cisco expertise, patents and software applications can be leveraged for managing the Home
- **The is a proliferation of Companies offering Service Enabling Applications (iControl, Open Peak, 4-Home, etc.) with numerous applications:**
  - Home Automation and Management
  - Home Security with event triggering webcams and notifications
  - Power Management to help make the US a greener place to live
  - Home Managed Healthcare
- **The TES301 has the MIPS and memory to support these applications**
  - Ported and demoed 4-Home OSGI/JVM applications
  - Porting and demoing iControl security and home automation applications
- **The SP owns/manages the Services and provides the secure conduit for remote access to these services**

# Home Security, Monitoring & Automation (iControl Example)

 Wi-Fi  
 Z-Wave  
 Ethernet

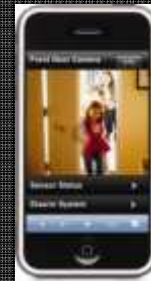




# Home Security, Monitoring & Automation

*(Example Use Case iControl)*

- **Home security with cellular/GPRS backup**
- **Remote home management from work or while traveling**
  - Arming/disarming of home security system
  - Lighting control
  - Thermostat control
  - Door lock control
  - Live video monitoring (view service providers, etc.)
- **Scheduling for convenience and energy efficiency**
- **Monitor children activity**
  - Live video of backyard, pool, playroom, etc
  - Alerts if prohibited areas are entered (gun closets, wine cabinet, etc.)
  - Email/text message alert with picture/video clip attachment
  - Alerts if children do not arrive home by specified times
- **General family tracking(Kids at home)**
  - Nanny/babysitter monitoring
  - Pet monitoring



# RG Value Proposition

- Cisco is best to support most challenging service – Video
- Can offer customized solutions to match SPs unique requirements
- Cisco is unique in having the key technology components that allow us to produce leading-edge, integrated solutions:
  - Residential Gateway Software (in-house development)
  - Network Magic home network management system
  - TR-069 remote management software (in-house development)
  - DLNA/UPnP support
  - Video bridge technology
  - HPNA and MoCA technologies
  - Femtocell technology



# Femtocell



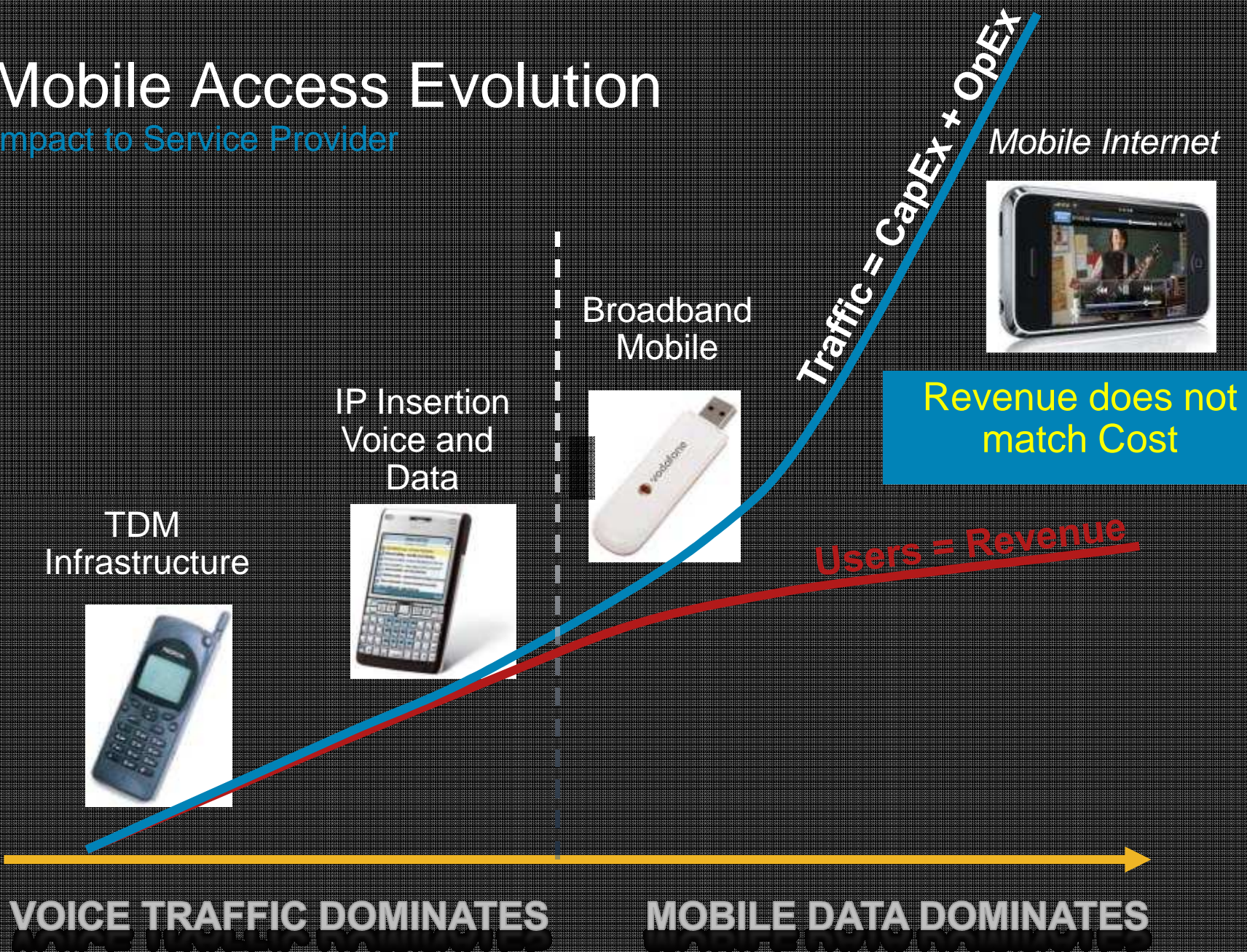
# Mobile Operator Challenges

- **C**overage in the home
  - ~30% of mobile voice originates in the home
  - Poor coverage leads to unhappy customers and churn
- **C**osts: need to lower OpEx
  - Backhaul of cell tower traffic** accounts for 20% of mobile operator OPEX
  - Site acquisition, leasing costs, power costs
  - Capacity demand is expected to be 4x to 10x** as migration to **3G and 4G** proceeds
  - Re-use existing handsets
- **C**hurn reduction: increase loyalty
  - High quality 3G signal in the home
  - Enable new service offerings (triple play)



# Mobile Access Evolution

Impact to Service Provider



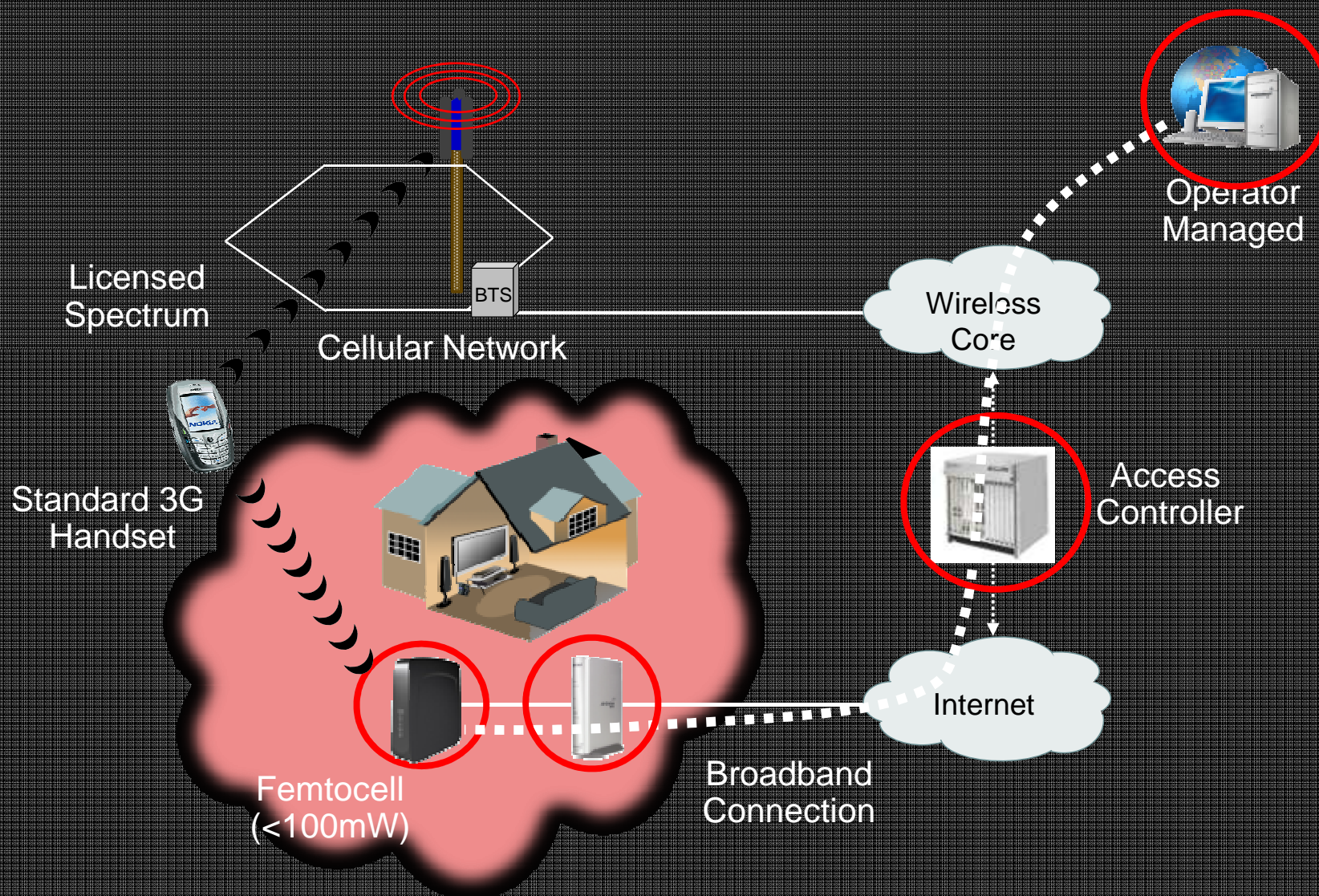
# Femtocells Dramatically Reduce Carrier Costs

	Capex Cost	Throughput	Capex Cost / Throughput
Macrocell (6 sector / 2 carrier)	\$400,000	15,000 Kbps	\$26.67 / Kbps
Femtocell	\$200	1,000 Kbps	\$0.20 / Kbps

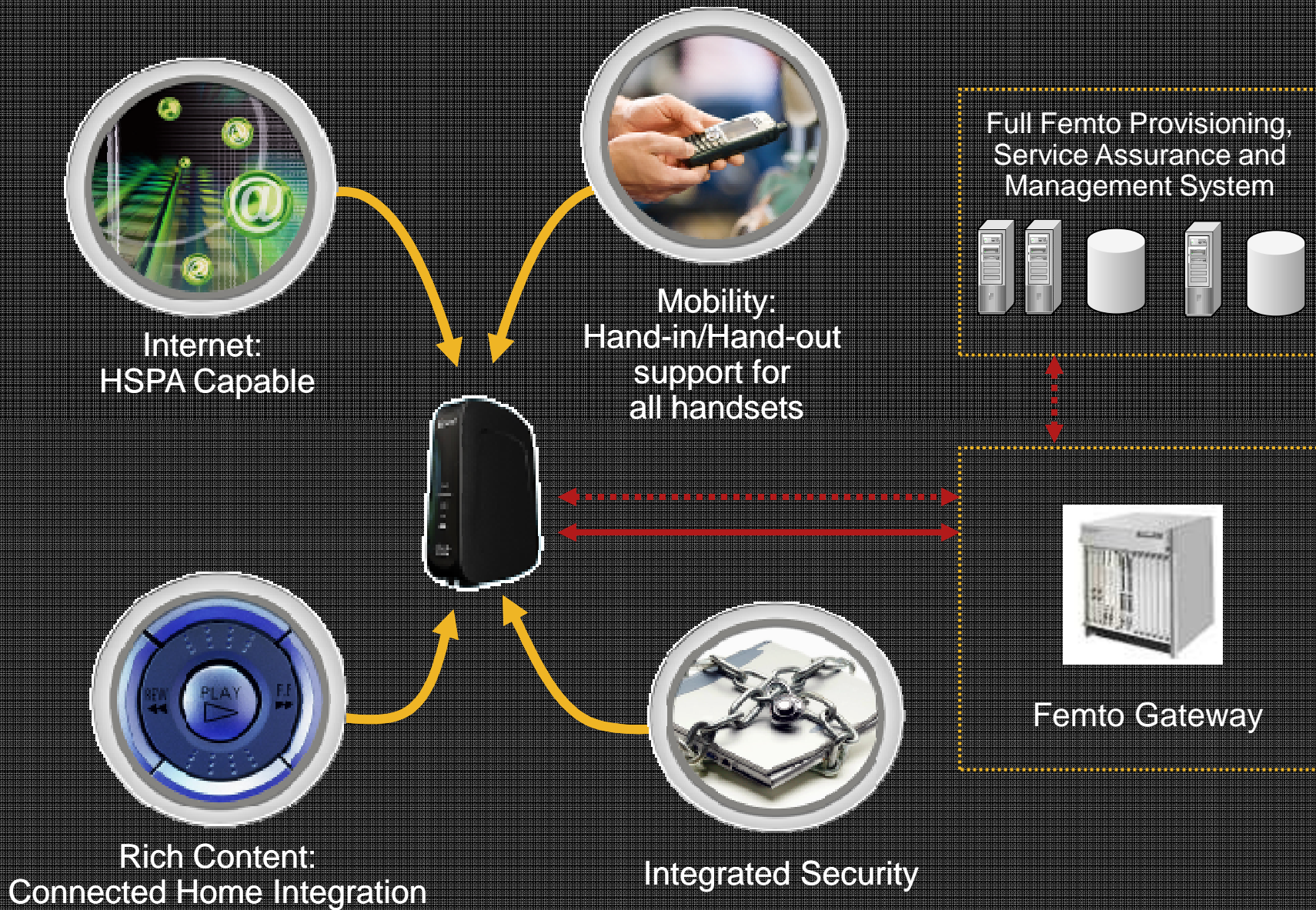
	Monthly Backhaul Cost	Comments
Macrocell	\$1.94 / kbps / month	\$300 per T1 per month at 10% average utilization
Femtocell	\$0.00 / kbps / month	Backhaul provided by ISP



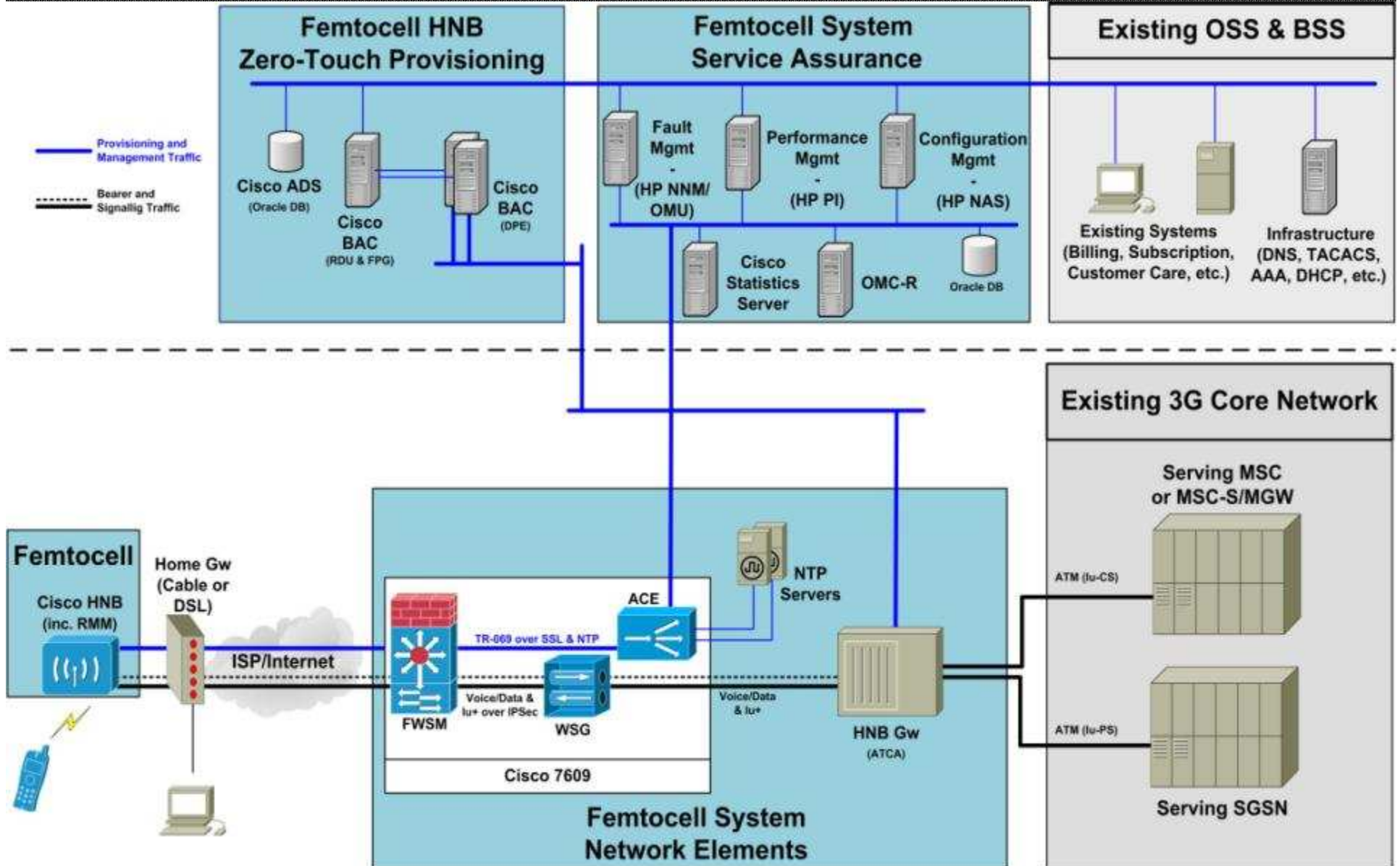
# Femtocell increases available bandwidth



# Cisco E2E Femtocell Solution



# Cisco Femtocell End-to-End Architecture



# Cisco/SPVTG Access Point

## DPH151 Product Features

- UMTS Bands: 1.9GHz & 850MHz (Band 2 & 5)
- 3GPP W-CDMA standard air interface
- Up to four simultaneous voice or data sessions
- AMR voice quality
- 10/100BASE-T WAN port – interface to DSL or Cable Modem
- 10/100BASE-T LAN port – for pass-thru of video and data traffic
- Managed Ethernet switch for traffic prioritization
- Front panel LED status indicators provide an informative and easy-to-understand display that indicates status and allows for simplified troubleshooting
- Compact design allows for free-standing mounting



DPH151-AT



# Case Study



## AT&T Connected Life at Home

# Challenge/Opportunity

- Faced with **broadband penetration maturity**
- Increasing **mobile substitution**, and competition from cable on the small and medium businesses front,
- AT&T has an opportunity to increase its customer value proposition by offering
  - an **enhanced IPTV service**, called U-verse TV, which leverages customers' next-generation IP network
  - while allowing them to **bundle it** with their other services such as broadband access, home phone, and wireless services.

# Strategy

- Push adoption of triple-play or quad-play services through bundling services.

“U-verse is beginning to reshape our consumer revenue profile,” says Richard G. Lindner, chief financial officer and senior executive vice president. AT&T is leveraging the successful U-verse offering to help push other services through bundling.

- Increase customer loyalty. U-verse customers are found to be very loyal. With such loyalty, AT&T is hoping to:

Drive up revenue per household. (AT&T posted its seventh consecutive quarter of year-over-year growth in consumer revenues per household, up 2.5 percent.)

Use U-verse to help retain wireless and wireline customers. (In the third quarter, AT&T had a 27.5 percent smaller decline in consumer connections than the third quarter a year ago. AT&T credits this smaller decline to the U-verse offering, but this could also be credited to a better economic outlook than a year ago.)

# Success Factors/Metrics/Monetization

- The goal is to increase U-verse TV subscribers by 240,000, bringing the total to 1.8 million, up more than 1 million over the past year. Across all eligible living units, U-verse TV penetration is just above 12 percent.
- According to a survey just published by the analyst firm Strategy Analytics, over 80 percent of Verizon FiOS and AT&T U-Verse television customers reported to be “very” or “extremely” satisfied with their provider. Cable customers, on the other hand, had the lowest satisfaction levels.
- More than three-quarters of U-verse customers were triple or quad play, combining TV, broadband, voice, and wireless.
- A year ago, consumer wireline IP revenues made up 23.2 percent of consumer wireline total. In the third quarter, these products represented nearly a third of consumer wireline revenues.
- Price packages vary by region.