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CISCO INNOVATE
Strategic Business Technology Forum

Shape Your Business For the Future:
Powering Transformation With Cisco

Next Generation Hotspot & WiFi Update

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19th June 2012
Manila, Philippines

Agenda

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SP Wi-Fi Market Trends

Architectural Approach - SP Wi-Fi

Cisco Technologies Differentiation

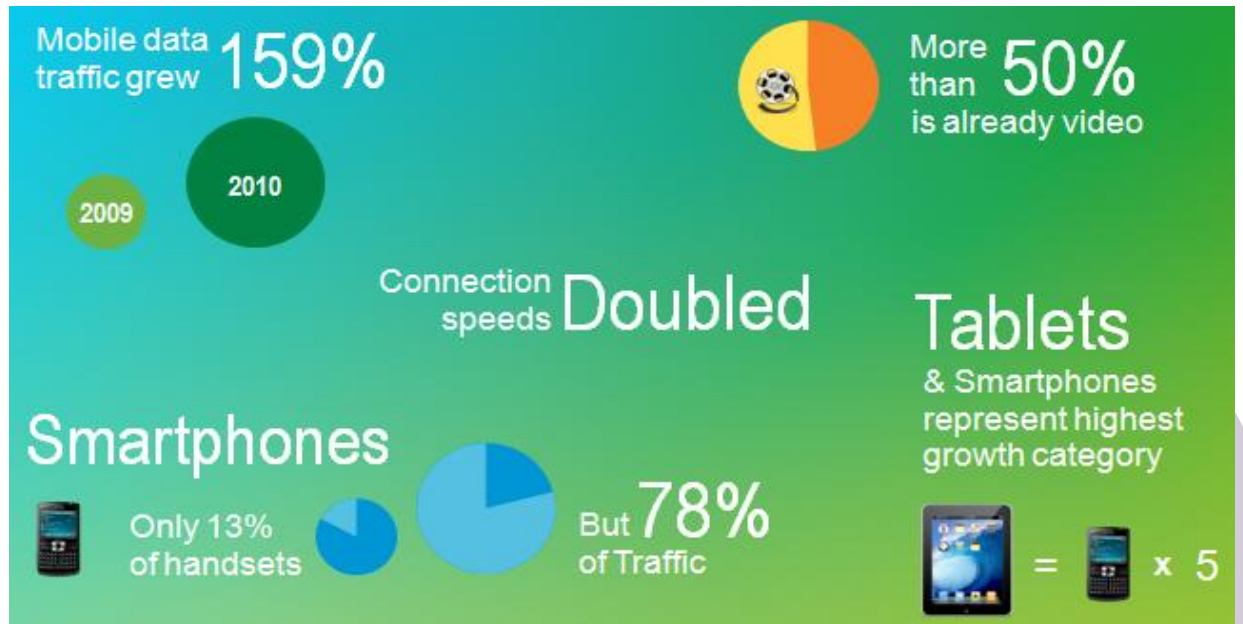Cisco SP Wi-Fi Product Overview

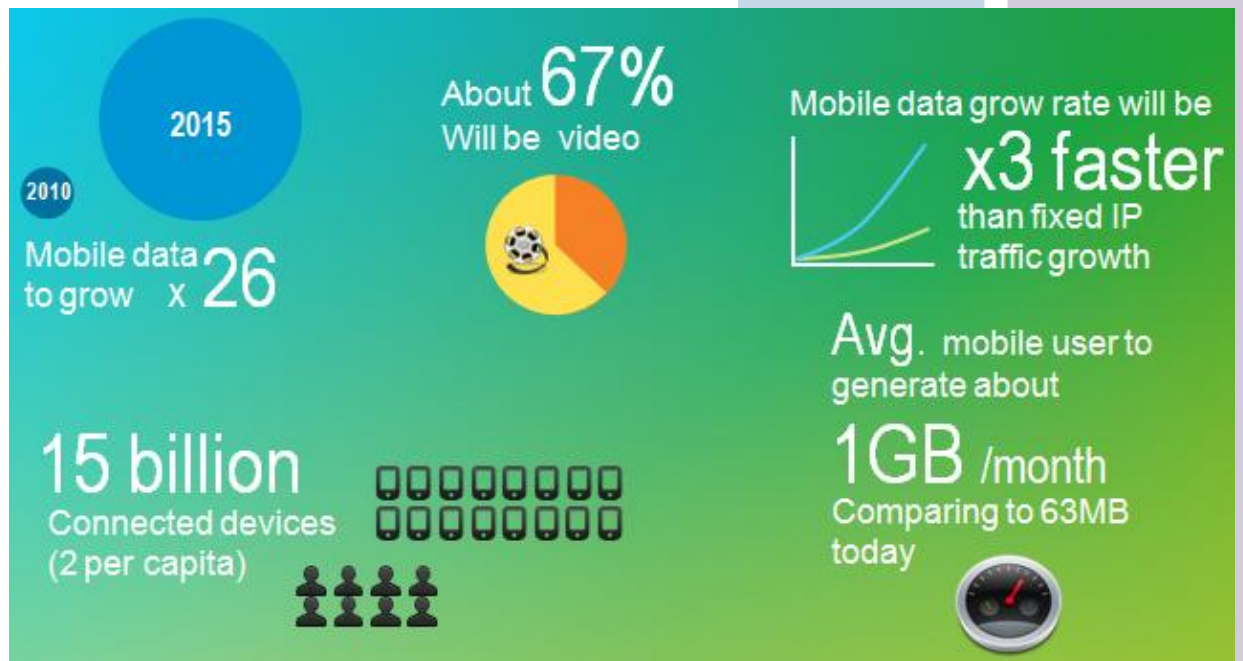Customer Business Models & References

SP Wi-Fi Market Trends

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2011
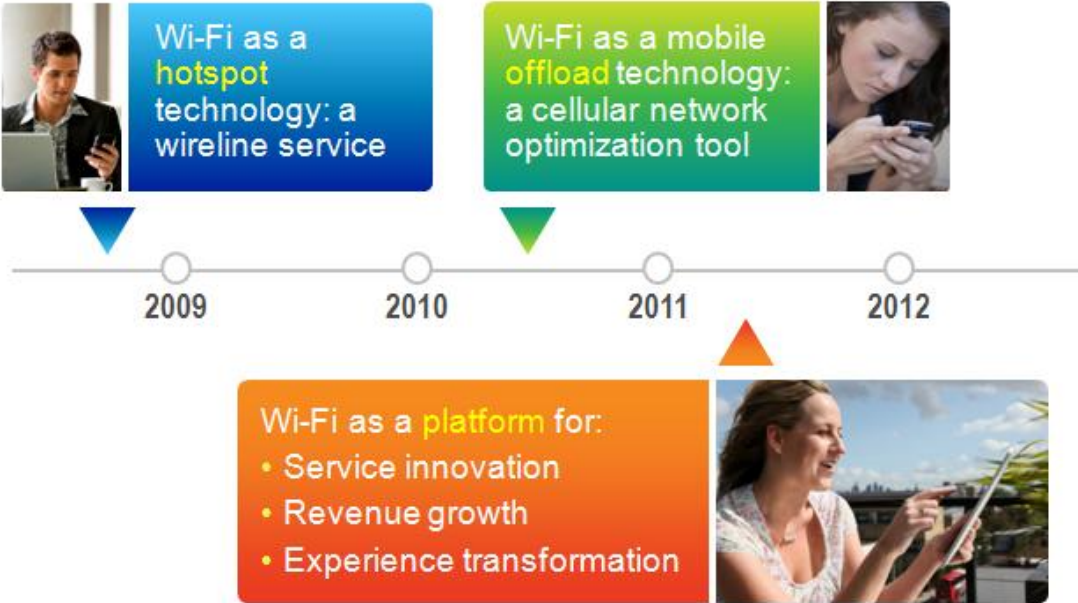
Do You Know?

2015

Are You Ready?

Mobile data traffic grew **159%**

2009

2010

More than **50%** is already video

Connection speeds **Doubled**

Smartphones

Only 13% of handsets

But **78%** of Traffic

Tablets
& Smartphones represent highest growth category

= × 5

2015

2010

About **67%** Will be video

Mobile data grow rate will be **x3 faster** than fixed IP traffic growth

Mobile data to grow × **26**

Avg. mobile user to generate about

1GB /month

Comparing to 63MB today

15 billion Connected devices (2 per capita)

Operators Adopt Wi-Fi as an Essential Complement to Mobile Services

Wi-Fi as a **hotspot** technology: a wireline service

Wi-Fi as a mobile **offload** technology: a cellular network optimization tool

2009   2010   2011   2012

Wi-Fi as a **platform** for:
- Service innovation
- Revenue growth
- Experience transformation

GSM: 2G/3G
- Focus on coverage
- City or country-wide
- Voice & basic data

Wi-Fi
- Provide spot capacity
- High-density areas
- Video & High-speed data

SP Wi-Fi Business Models & Value Creation Sources

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B Internal value to Service Provider

Cost Savings

Data offload

Indirect

Retention
Market share
Up-sell

B2C Service Provider selling to Consumers

End-user Access

Guest access

Services

Voice & Video
Premium hot-spot

B2SP Service Provider selling to other Providers

Federation

Roaming

Offload

Offload wholesale

B2B Service Provider selling through other businesses

3rd Party

M2M
Concierge
Advertising

Venue Owners

University
Stadium
Municipality

Architectural Approach
SP Wi-Fi

SP WiFi Architecture Requirements

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Flexible Architecture
- ◆ Multiple Segments : Hotspot , Hot zone and Flatbed
- ◆ Multiple Business Models : B, B2C , B2B and B2B2C

Carrier Grade Access
- ◆ ED RRM , Zero Touch , High Capacity/Coverage
- ◆ Local Switching , Quality of Service and IPv6

Mobility Experience
- ◆ Automatic Discovery , Authentication and Roaming
- ◆ Session Persistence : Inter and Intra RAT

Standards Interfaces
- ◆ Client and Client Less Options
- ◆ IEFT , IEEE , 3GPP . WBA , WFA , GSMA Compliance

Packet Core Integration
- ◆ Mobile Packet Core : Session and Mobility Management
- ◆ Mobile Eco System : HLR/HSS , PCRF , OCS/OFCS and LI

Next Generation Hotspot Technology Creates a 3G-Like Experience

	GSM	**Wi-Fi Hotspot today**	**Wi-Fi NG Hotspot**
Automatic network selection	✔	✖	✔
Transparent authentication	✔ MCC MNC	✖	✔ 802.11u
Secured air interface	✔ EAP-SIM/AKA	✖	✔ EAP-SIM/AKA
Security: rogue prevention	✔ A5	✖	✔ 802.1x
Transparent roaming	✔ A3/A8	✖	✔ 802.1x
Full mobility & portability	✔	✖	✔

Standardizations
Addressing Architectural Challenges

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	I-WLAN 3GPP	→	PMIPv6 & Hotspot 2.0 3GPP WiFi IETF
Access network type	Untrusted		Trusted
Architecture type	Client-based		Network-based
Automatic discovery	✖		✔
Transparent authentication	✖		✔
Security over air interface	✔ Not by local hotspot		✔ Both client & hotspot
Integration with mobile core	✔		✔
Local offload to Internet	✖		✔
Transparent roaming	✖		✔
Full mobility & portability	✖		✔

enodeB

SP Wifi Roaming Architecture
EAP-SIM

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AP Infra

AP

WLC

NAS Client

EAP-x

AAA Server/Proxy

Subscriber DB /HLR

Air interface (WPA2-AES Encrypted)

HANDSET

Supplicant

802.1x (EAP)

ANQP   ANQP

Driver (11u)

Chipset (Broadcom,Atheros,TI,etc..)
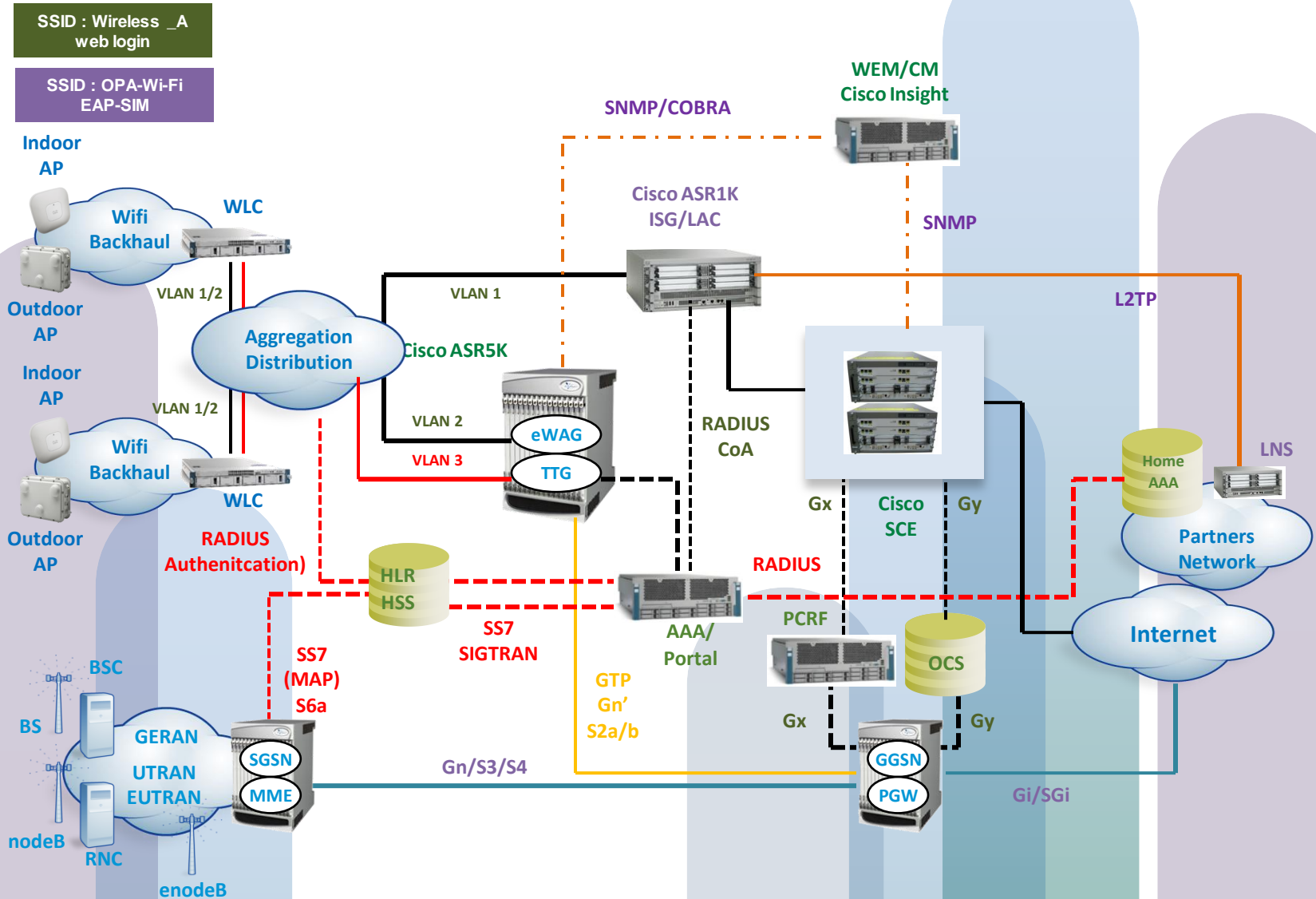
Roaming Partner

EAP-x

AAA Server

Subscriber DB /HLR
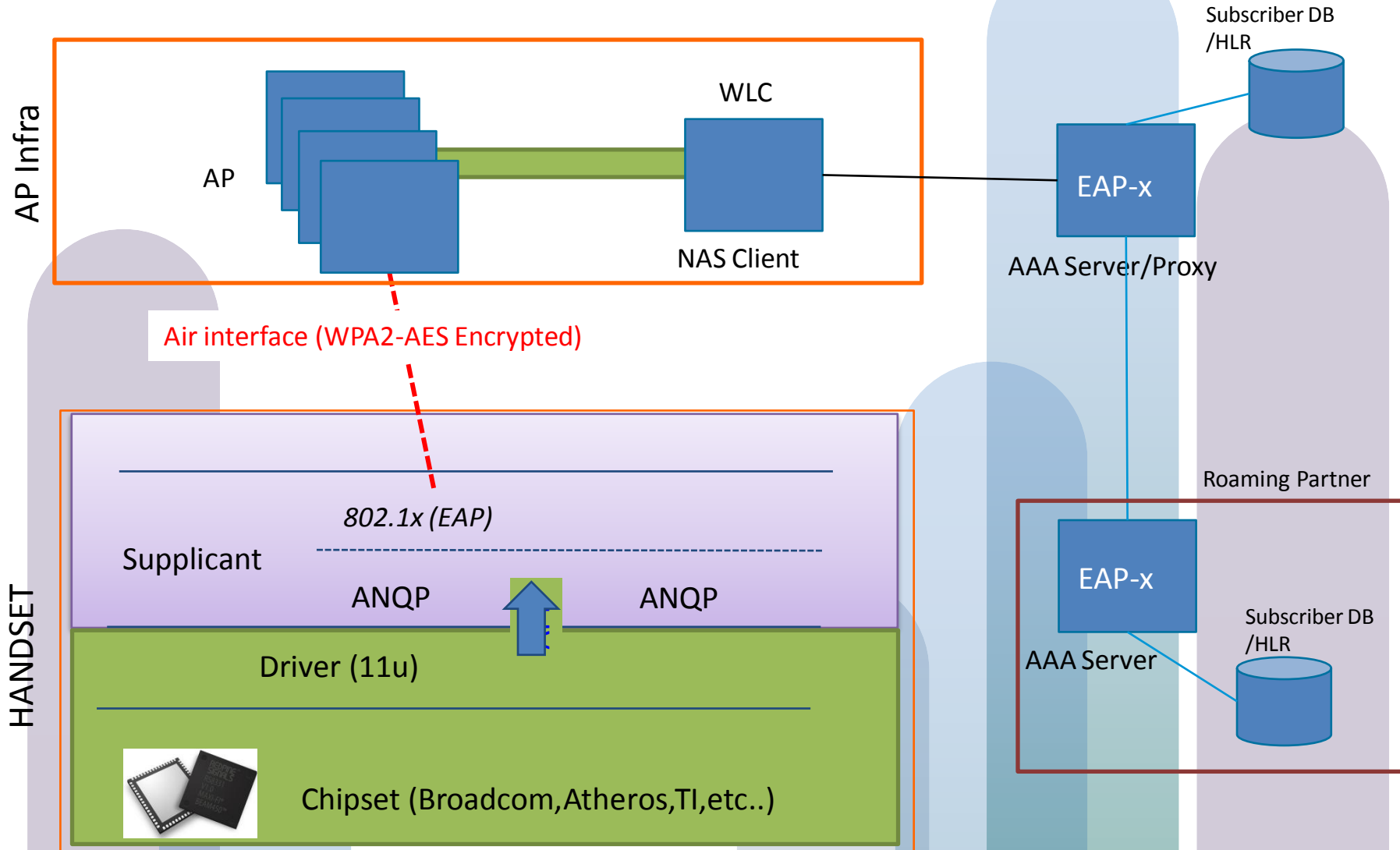
SP Wi-Fi Architecture

(Clientless Wifi Offload – ASR1K , SCE8000 DPI, Portal & Policy Manager/Charging)
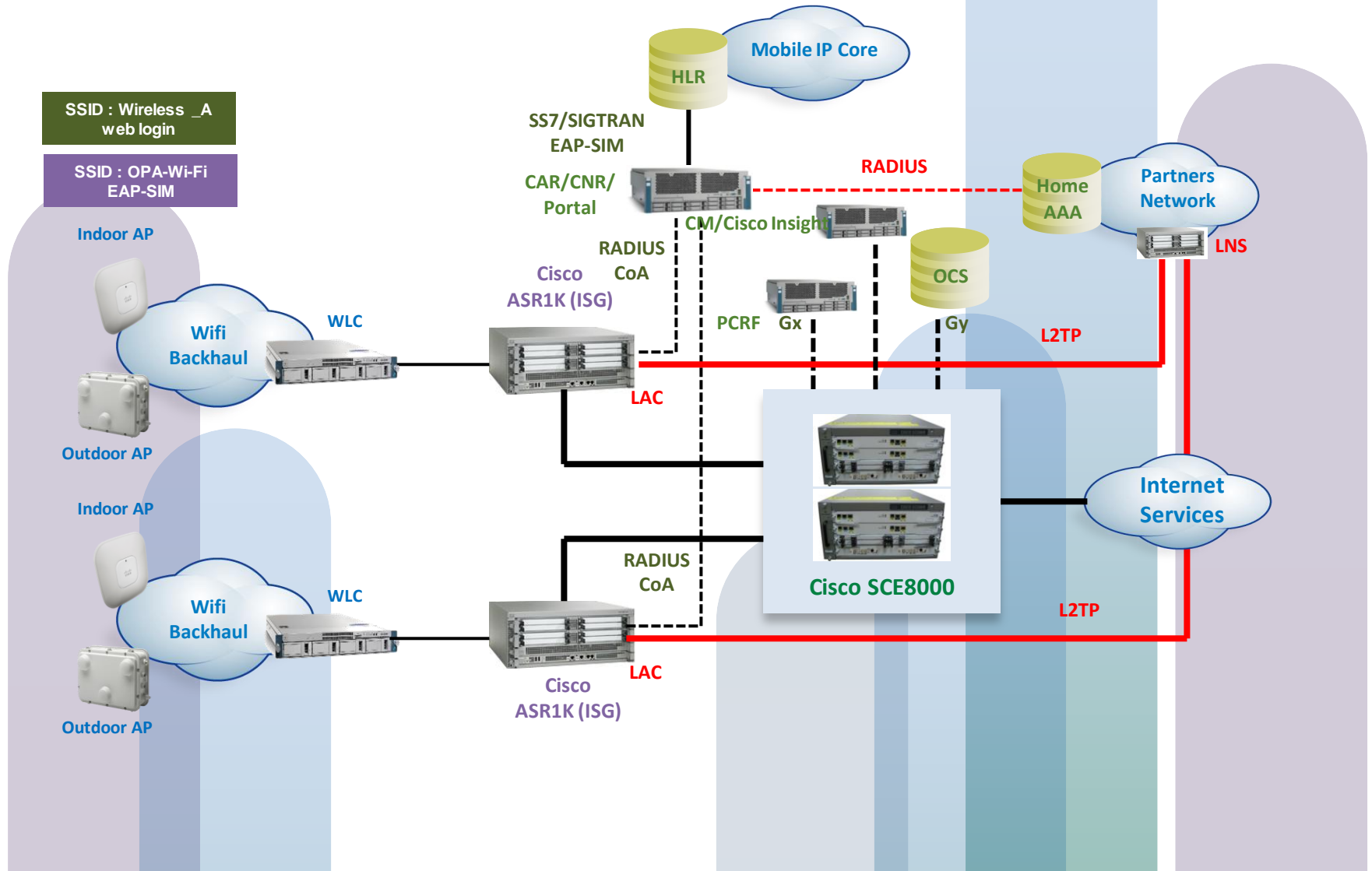
SP Wi-Fi/3G Architecture

(Client/Clientless Wifi Offload – ASR1, ASR5K/SCE. DPI, Portal & Policy Manager/Charging)

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SSID : Wireless _A web login

SSID : OPA-Wi-Fi EAP-SIM

Indoor AP

Wifi Backhaul

WLC

WEM/CM Cisco Insight

SNMP/COBRA

Cisco ASR1K ISG/LAC

SNMP

VLAN 1/2

Outdoor AP

Indoor AP

VLAN 1

Aggregation Distribution

Cisco ASR5K

L2TP

VLAN 1/2

Wifi Backhaul

WLC

VLAN 2

VLAN 3

eWAG

TTG

RADIUS CoA

Home AAA

LNS

Outdoor AP

RADIUS Authenitcation)

Gx

Cisco SCE

Gy

Partners Network

HLR HSS

RADIUS

BSC

SS7 (MAP) S6a

SS7 SIGTRAN

AAA/ Portal

PCRF

OCS

Internet

BS

GERAN

GTP Gn' S2a/b

Gx

Gy

UTRAN EUTRAN

SGSN

MME

Gn/S3/S4

GGSN

PGW

Gi/SGi

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RNC

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SP Wi-Fi/4G Architecture

(Client/Clientless Wifi Offload – ASR1, ASR5K, SCE, Portal & Policy Manager/Charging)
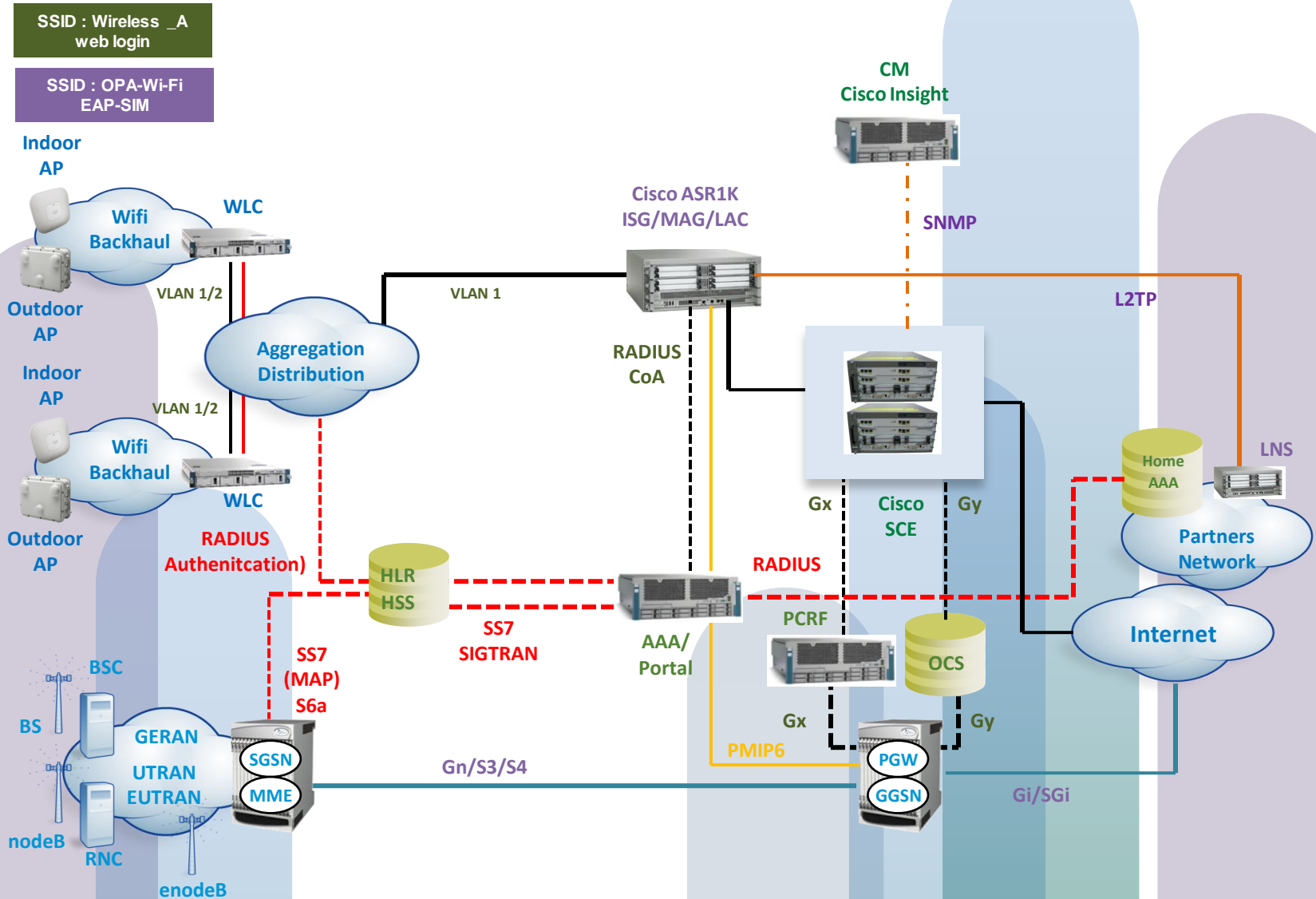
Cisco Technologies Differentiation

RF Intelligence Helps Service Providers Deliver High-Quality Service over Wi-Fi

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ClientLink
Beamforming: focusing RF energy towards clients

- Up to 87% throughput improvement
- 20% range increase
- Tested & validated by Miercom

BandSelect
AP-assisted 5Ghz band selection

- Optimizes RF utilization
- Frees up 2.4GHz space for single band clients
  - Higher user density

CleanAir
Silicon-based spectrum analyzer

- Automatically mitigate impact of wireless interference
- Self-healing, optimization
- Network-wide visibility

Interferer Location with Zone of Impact

VideoStream
Wireless optimized for video

- Video quality optimization
- Resource reservation and streaming prioritization
- Reliable multicast

Cisco IEEE 802.11e/h Support

Smartphone Battery Life is No Longer an Issue

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While Active

IEEE 802.11h Transmit Power Control allows devices to fine-tune their transmit power and save more

**1** Modern smartphones have almost no impact having Wi-Fi turned on

In Standby

IEEE 802.11e Power-Save Polling allows a more intelligent standby mode, reducing consumption to minimum

WMM Power Save cuts up to 40% of battery consumtion and optimized for multimedia transmission

2 Transferring large amounts of data over Wi-Fi is more efficient

Higher user speeds:

GSM   Wi-Fi
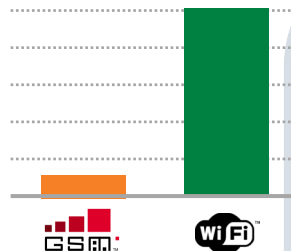
Shorter transmission times:

Wi-Fi

GSM

Time
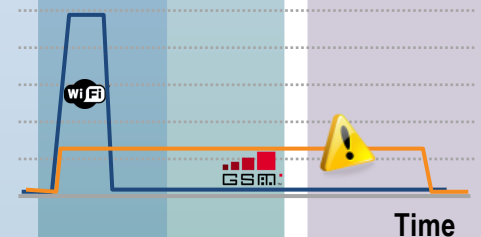
Cisco SP Wi-Fi Product Overview

Cisco Portfolio

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Products

- Indoor AP
- Outdoor AP
- Residential Gateway
- Cisco Wireless Controller
- Cisco Intelligent Services Gateway
- Cisco CAR, CNR, Policy, & NCS
- Cisco Mobile Packet Core

System

- AP
- WLC
- ISG
- Cisco Mgmt & Provisioning
- Cisco Mobile Packet Core
- 3rd Party OSS/BSS

Solution

Cisco SP Wi-Fi Advanced Services Practice

Solution Engineering and Customization

Whole Offer

Cisco & 3rd Party Products

Cisco SP Wi-Fi Advanced Services Practice

Solution Engineering and Customization

Cisco Capital

Customer Business Models & Go-to-Market Packages

Your Experience

Fragmented to one stop shop
Product to solution
Technology issue to business solution

Operator

Customer References
&
Business Model

ATT (USA)

Probably one of the most aggressive integrated SPs with respect to WiFi, but strategy seems to be helping network congestion.

AT&T Wi-Fi Locations
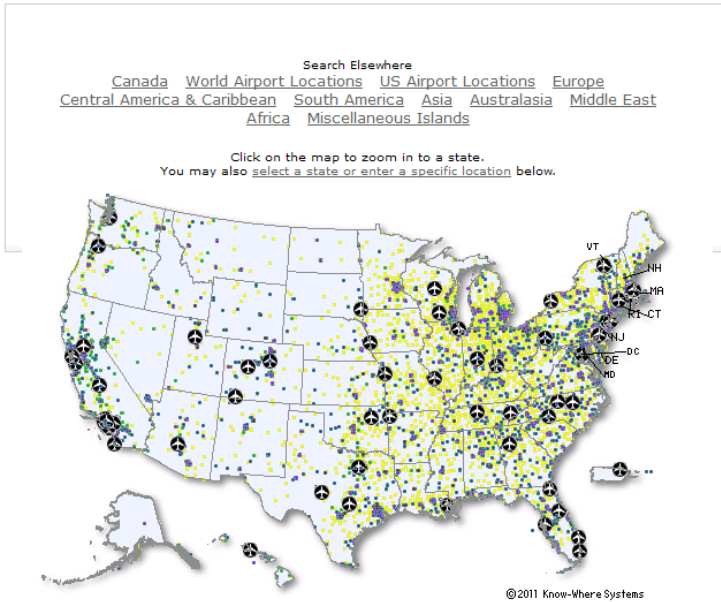
11-08-2008: AT&T has acquired WiFi provider Wayport for $275 million in cash. This adds thousands of new wireless hotspots to the company's network … and the best part is that it was recently opened to free access by iPhone users!

AT&T now has 20,000 access points in the US and 80,000 internationally

More than 8000 are located in restaurants or Starbucks locations, 700+ in bookstores, and another 50+ can be found in supermarkets. The network is also accessible at 12 airports, 31 hotels, 23 universities, 18 convention centers, and 5 sport complexes.
Note: Subscribers are limited to 150 uses per month. Approx . 20% of data traffic over WiFi.

2010 Launch of a new "hotzones" located in New York City's Times Square, downtown Charlotte and Chicago providing an extra layer of coverage enabling higher data speeds while moving traffic off of the carrier's cellular network.

Source; Cisco IBSG

Comcast (USA)

Partnering with Cablevision and Time Warner to provide a broad WiFi network, while continuing 3/4G plans with Sprint/Clear.
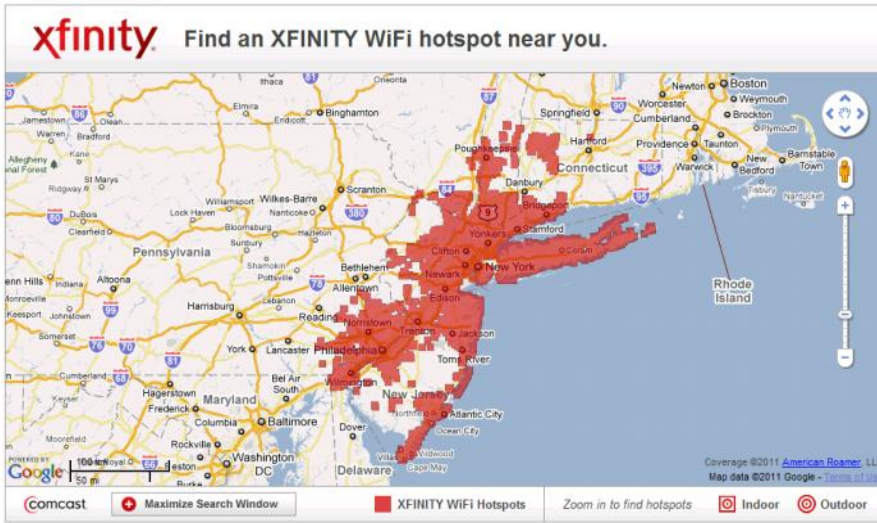
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XFINITY WiFi is a service exclusively for XFINITY Internet subscribers that connects your laptop or WiFi-enabled device to the Internet when you are in one of our many, public WiFi hotspots. Allowing you to connect with up to 3 devices, XFINITY WiFi is included with your XFINITY Internet subscription at no additional cost.

Cablevision, Time Warner, and Comcast have all teamed up to announce a roaming agreement that will allow their subscribers to freely roam on any of the companies Wi-Fi networks. According to the press release, authentication for this to happen is already in place starting today, so if you were just sticking to your own cable provider's magic hotspot, fell free to mosey on over to one of the partner networks.

Comcast launches a personal 4G/3G mobile hotspot, for its Xfinity Internet 2go service. The devices connects to 4G or 3G network and shares the connection to up to 5 WiFi enabled devices. It supports download speeds up to 6 Mbps with 4G service and up to 1.4 Mbps with 3G service. Requires a $25 one-time fee with a qualifying Xfinity Internet 2go service plan.

Source; Cisco IBSG

Deutsche Telekom (Germany)
Through T-Mobile, DT has been one of the early adopters of public WiFi hotspot services in Europe and maintains this focus.

DT/T-Mobile currently operates around 8,000 own WiFi hotspots in Germany and 20.000 WW; through ,roaming partners they provide access to approx. 50,000 HS. Internationally their focus is on business customers (airports, hotels, conference centers, …), in Germany they also have a consumer footprint. Larger deployments focused on stadiums, some special projects such as WiFi on fast trains.

Different tariff models for WiFi HS service: Hotspot Basic (pay per minute, only for exist. mobile customers), Hotspot Pass (hour, day, month), Hotspot Pass Sky (1h, 24h in Lufthansa planes). Hotsplot flat rates are included in many mobile tariffs but also in 2play/3play packages. The use of WiFi in the home is currently not monetized directly.

WiFi represents an important differentiator in DT/T-Mobile's mobility portfolio. It supports the brand promise of innovation and to bring the Internet everywhere and to use best possible technology. Creates strong visibility with key projects such as R@ilnet (with Deutsche Bahn) or Flynet (with Lufthansa). Also seen as strong driver for use of mobile data service and access to customers with WiFi only devices (laptops, pads, …).

Source; Cisco IBSG

France Telecom / Orange (France)

Very dense footprint in France offering WiFi specific services.

Orange is one of the largest providers of public WiFi services by operating over 30,000 hotspots in France only. Apart from basic Internet access, Orange offers a set of specific services on WiFi such as HD video, a Web 2.0 portal with social networking apps/services.

Non Orange customers can obtain access through acquiring vouchers. For existing customers WiFi is part of their tariffing plans either as a flat rate component of usage based.

Orange is continuing to run and expand the WiFi network and associated services as complement to their 3G/4G networks with HS 2.0 .

Source; Cisco IBSG

Full stadium implementation of Cisco APs , Cisco Gateway, Cisco UCS and Broadhop/CiscoPrime policy....

A snapshot from the Super Bowl.

> Cisco E2E Wi-Fi deployed by Verizon Wireless in Lucas Oil Stadium
> Each user was temporarily re-directed to a splash page, then authenticated. There was no fee or special login credentials required (free access).
> The super bowl attendance was 68,658

- Statistics Captured 1 hour Prior/After Game

  Peak session total 7,120 (11% of attendees)

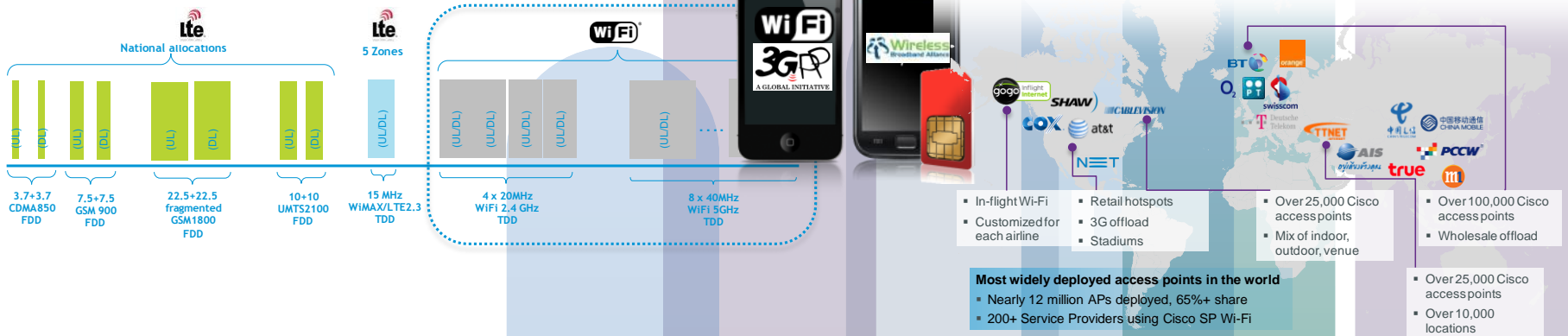 Lowest session total 6,332 (9% of attendees)

  Average session total 6,780 (10% of attendees)

  Total sessions during the six hour period measured – 45,000

Customer Business Models

Categories	Business Model	Use Cases	Case Study
B ① **(Internal value to SP)**	**Business Effectiveness**	1. Optimised cost per bit 2. Bundled Wi-Fi • Address churn • Cross Sell • Up Sell ARPU 3. Extended CDN	at&t KDDI Optimum WiFi comcast
B2C ② **(Value from SP selling to SP Customers)**	**End User Services**	1. Wi-Fi Access direct 2. Premium Hotspot 3. Business Anywhere 4. Video over Wi-Fi	at&t T-Mobile boingo orange
B2SP ③ **(Value from SP selling to other SPs)**	**Inter-Carrier Partnership**	1. Wholesale Mobile offload 2. Infrastructure sharing 3. Hosted Small Cells 4. WiFi Roaming	boingo swisscom
B2B ④ **(Value from SP selling through other businesses)**	**Value Added Services**	1. Machine-to-Machine 2. Subletting Model 3. Advertising Model 4. Embedded Connectivity 5. Connected venues/hubs 6. Retail Store Interactions	boingo verizon T-Mobile

Summary

- In the face of **rapid mobile broadband adoption** and increasing demand, 2G and 3G networks in Philippines will continue to be constrained

- **Unlicensed spectrum** and global **Wi-Fi eco-system** offers **great opportunity** for service providers now

- **Next Generation Hot-spot** and integrated policy/charging are the technology levers to support flexible business and commercial models for lower cost per bit and new revenue streams

- **Cisco's Service Provider Wi-Fi** complete solution provides **proven carrier grade** Access, Aggregation and Core capability with **economical TCO**

Thank you.