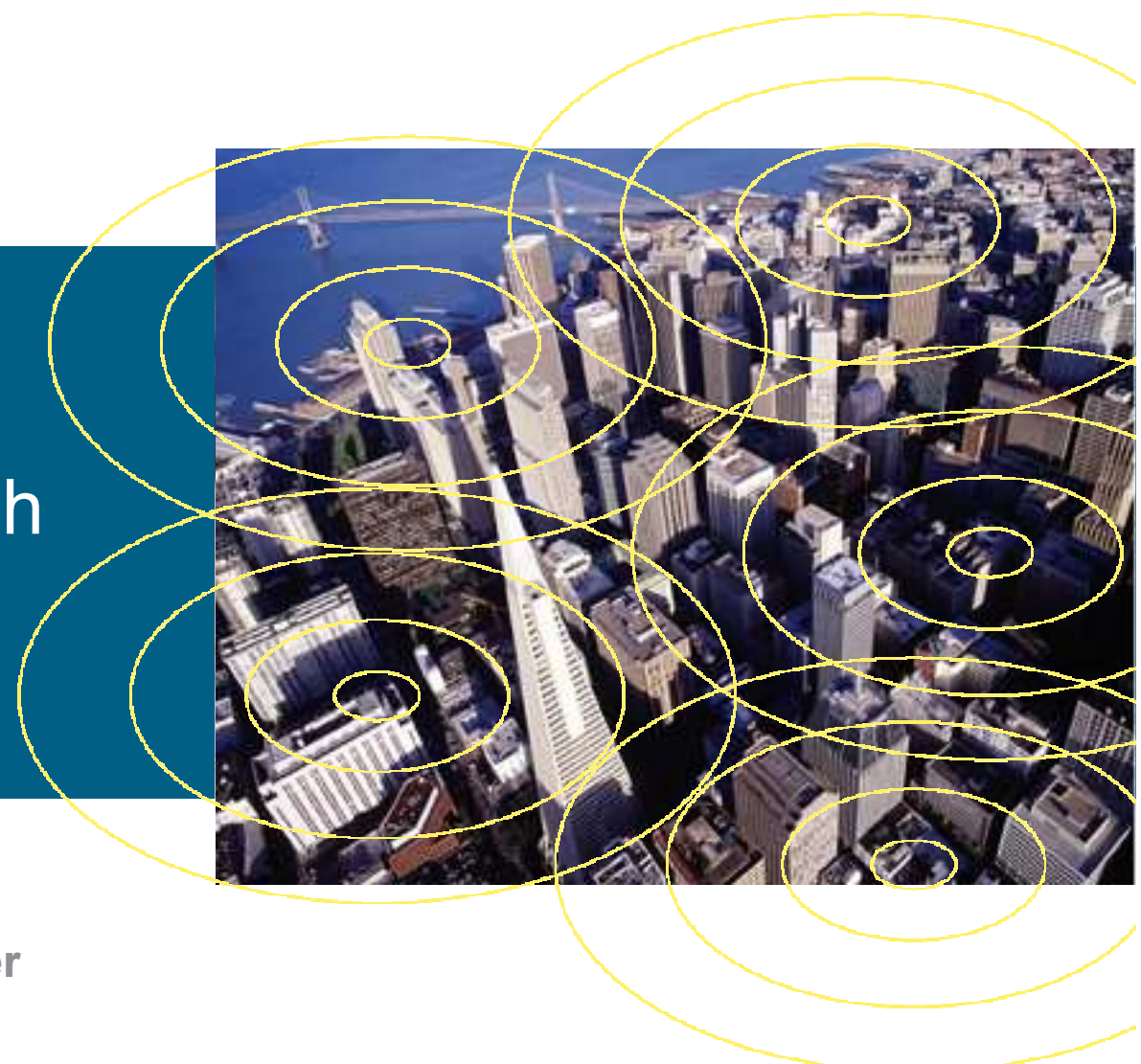




# Cisco ServiceMesh

**Thomas Koenig**  
**Wireless Product Manager**  
**AsiaPac**



# What is Cisco ServiceMesh?

A manageable end-to-end architecture that securely and dynamically provisions subscriber access and value-added services profitably across wireless mesh networks

For Service Providers (SPs) partnering with municipalities in an effort to:

- Provide ubiquitous regional wireless broadband
- Provision value-added services to varying classes of users

Consumers



Businesses



Governments



# Agenda



Motivation for Municipalities



Business Case for Service Providers



Overview of Cisco ServiceMesh



Applications & Deployments



# Motivation for Municipalities



# Wireless Mesh Benefits to Local Government

## *Wireless networking: contributions to Muni objectives*

**Run city projects and organizations more efficiently**



**Enable city workers with data access everywhere**

**Improve transportation and infrastructure**



**Tracking of public transport units and cameras**

**Bridging the Digital Divide**



**Provide affordable connectivity to low-income residents**

**Attract new business and residents**



**Interconnect businesses, citizens, and tourists**

# Empowering Employees and Citizens

## *Goals for Municipal Governments*

▶ **A more effective local government**



▶ **A stronger community**

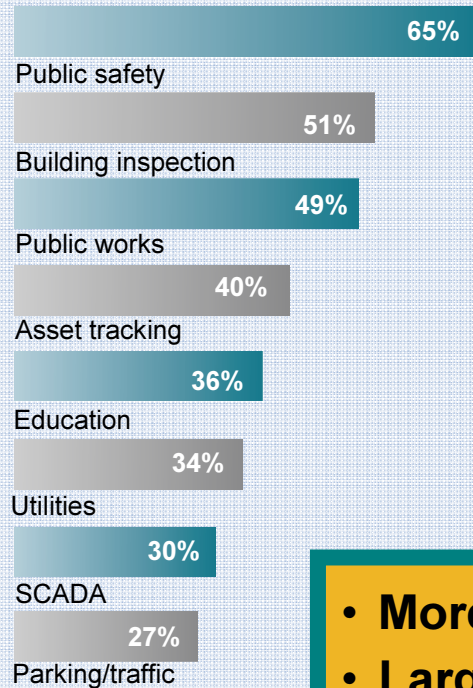


▶ **More engaged citizens**

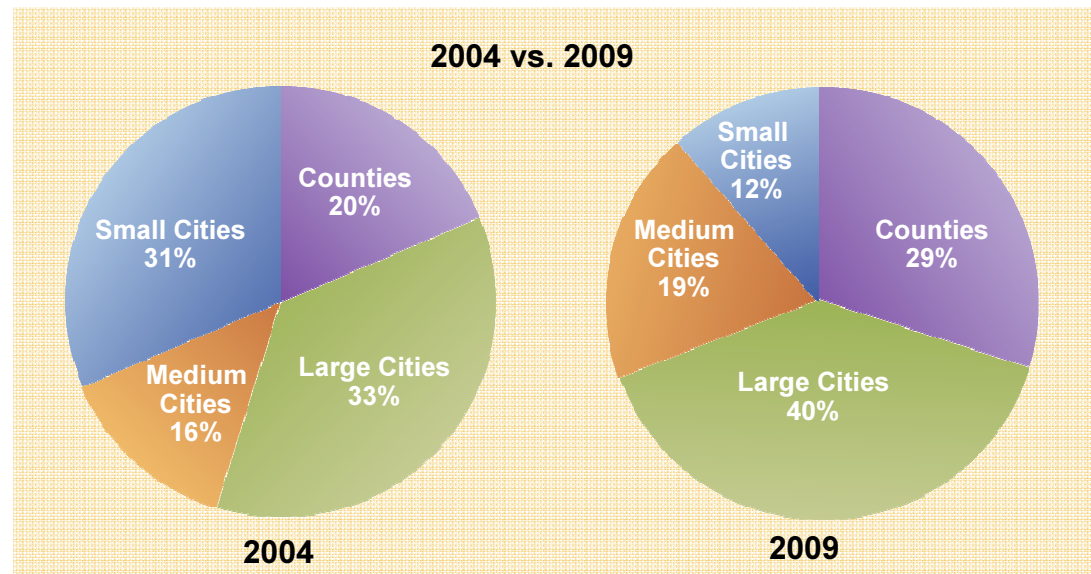


# State of the Municipal Wireless Market

Top Municipal Applications



Municipal Wireless Spending By Municipality Type



- More applications, more simultaneous
- Larger size deployments
- Doubling in size every year

2004-2009 U.S. Spending for Municipal Wireless Networks

	2004	2005	2006	2007	2008	2009
<b>Spending (\$millions)</b>	\$47.4	\$116.9	\$235.5	\$458.6	\$941,0	\$1,757.5
<b>YTY Growth Rate</b>	N/A	147%	102%	95%	105%	87%

Source: 2006 Municipal Wireless State of the Market Report

# But Who Takes the Lead?

## Municipality

### Primary goals

- Safer community
- Higher productivity
- Attract more customers

- D

### Challenges

- Network expertise
- Cost outside own needs

## Service Provider

### Primary goals

- Higher revenues
- Higher profit

- Paying customers

## Venue

### Primary goals

- Support core business (event, resorts, hotels, university, corporate campus, etc)
- Attract more customers

### Enablers

- Existing customers to grow from

### Challenges

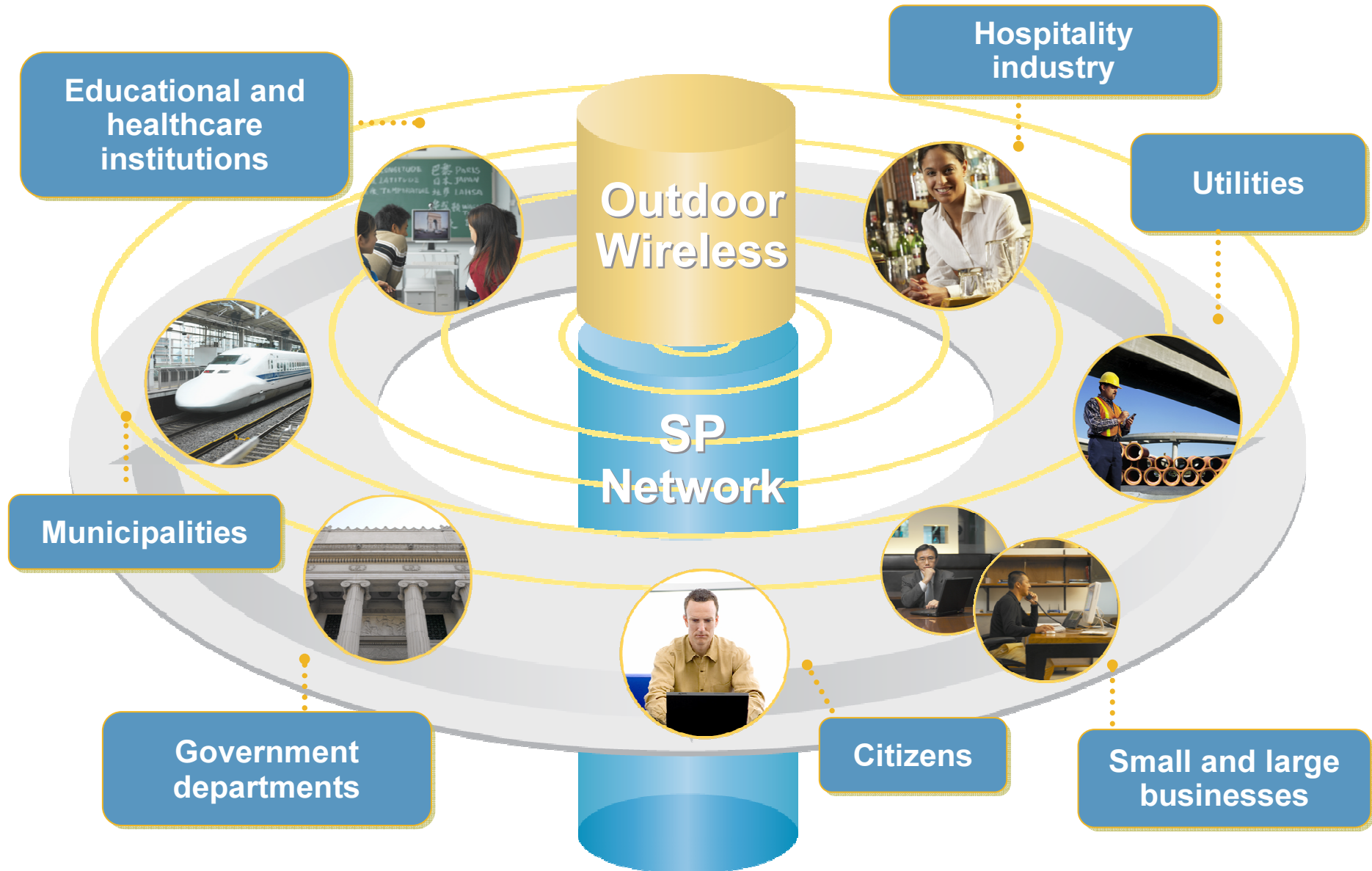
- Cost of solution vs increase in revenue

Emerging model is municipality in the lead with Service Provider as main partner

# Business Case for Service Providers

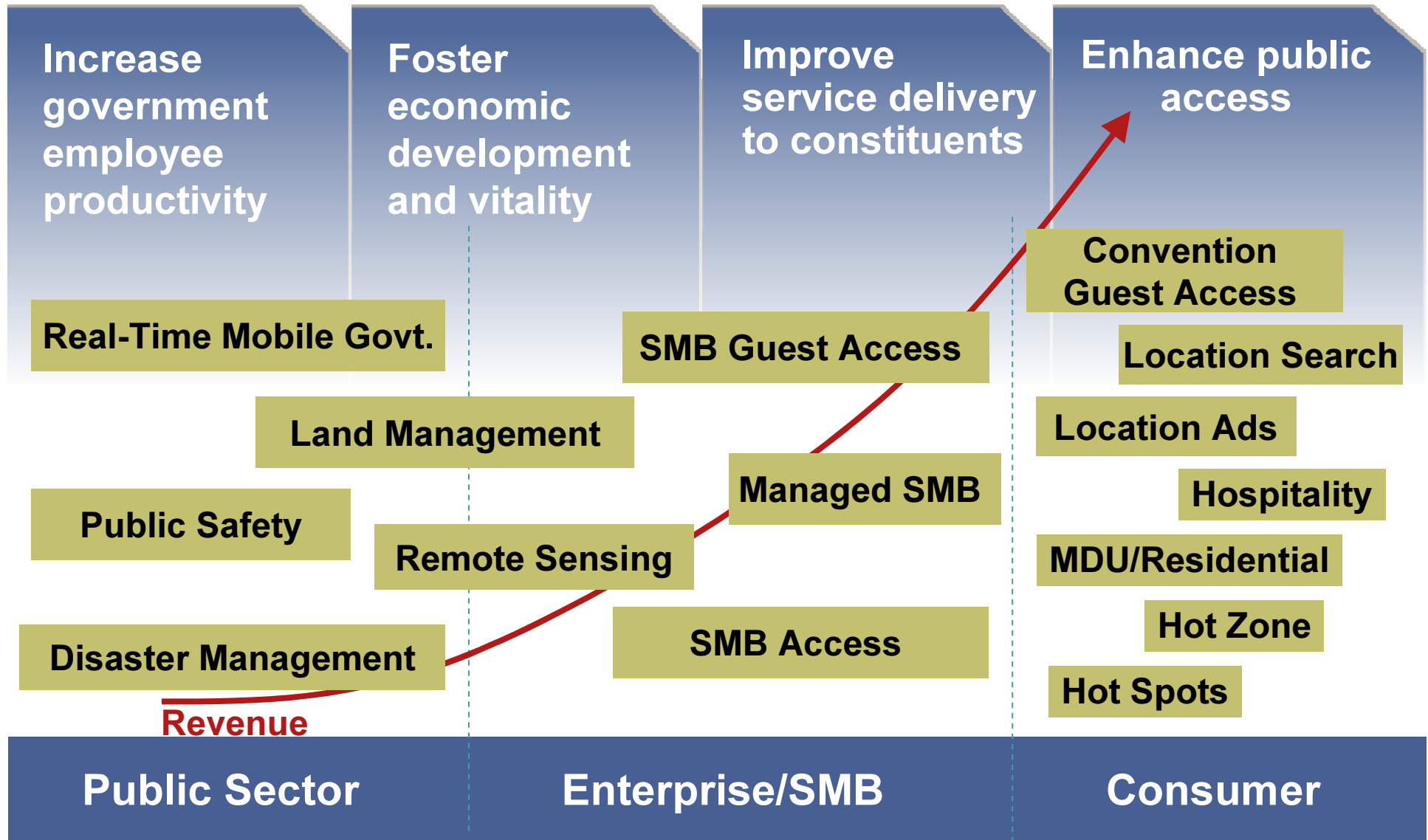


# Revenue Opportunities for Service Providers



# Incremental Revenue, Common Infrastructure

*Multiple applications per customer group*



# OTT Revenue Generation

## *Revenue Sharing with Service Providers*



YAHOO!



Google™



AOL®



msn®

Location-based Ads

Location-based Search

Local Content

Personalized Portal

Branded Content/Applications

# Location-Based Services

## Web Portal Advertising Insertion

The screenshot shows the ESPN ZONE mComm Denver web portal. At the top, it features the ESPN ZONE logo, the slogan "CATCH ALL YOUR SPORTS ACTION HERE", and a location indicator for "DENVER". Below this is the mComm logo, navigation links for "About mComm", "Manage My Account", and "FAQs", and the date "Monday, October 30, 2006". A weather widget shows "Denver, CO" with a current temperature of 64° and a high/low of 68°/43°. A local search bar is also present.

The main content area includes a "Welcome To Denver" section with a cityscape image and a login section titled "Getting connected is easy. Just choose one of the login methods to the right." The login methods are: "Login with an Existing Account" (with fields for username and password), "Create Account", "Forgot Password?", "Use an Access Code", and "Roaming Login". A "Cingular" logo is visible at the bottom of the login section.

A map of Denver is displayed, showing the user's location at "1400 16th St, Denver, CO 80202". The map includes street names like 5th St, 17th St, and 20th St, and landmarks like Union Station and the Pepsi Center.

On the right side, there are several advertisements: a "christy sports" banner for ski and board rentals, a "HYATT" banner for the Hyatt Regency Denver at the Colorado Convention Center, and a "BroadHop" banner for service management. A "What To Do" section at the bottom lists "Six Flags - Elitch Gardens" with contact information.

Local Content

Local Banner

Local Search

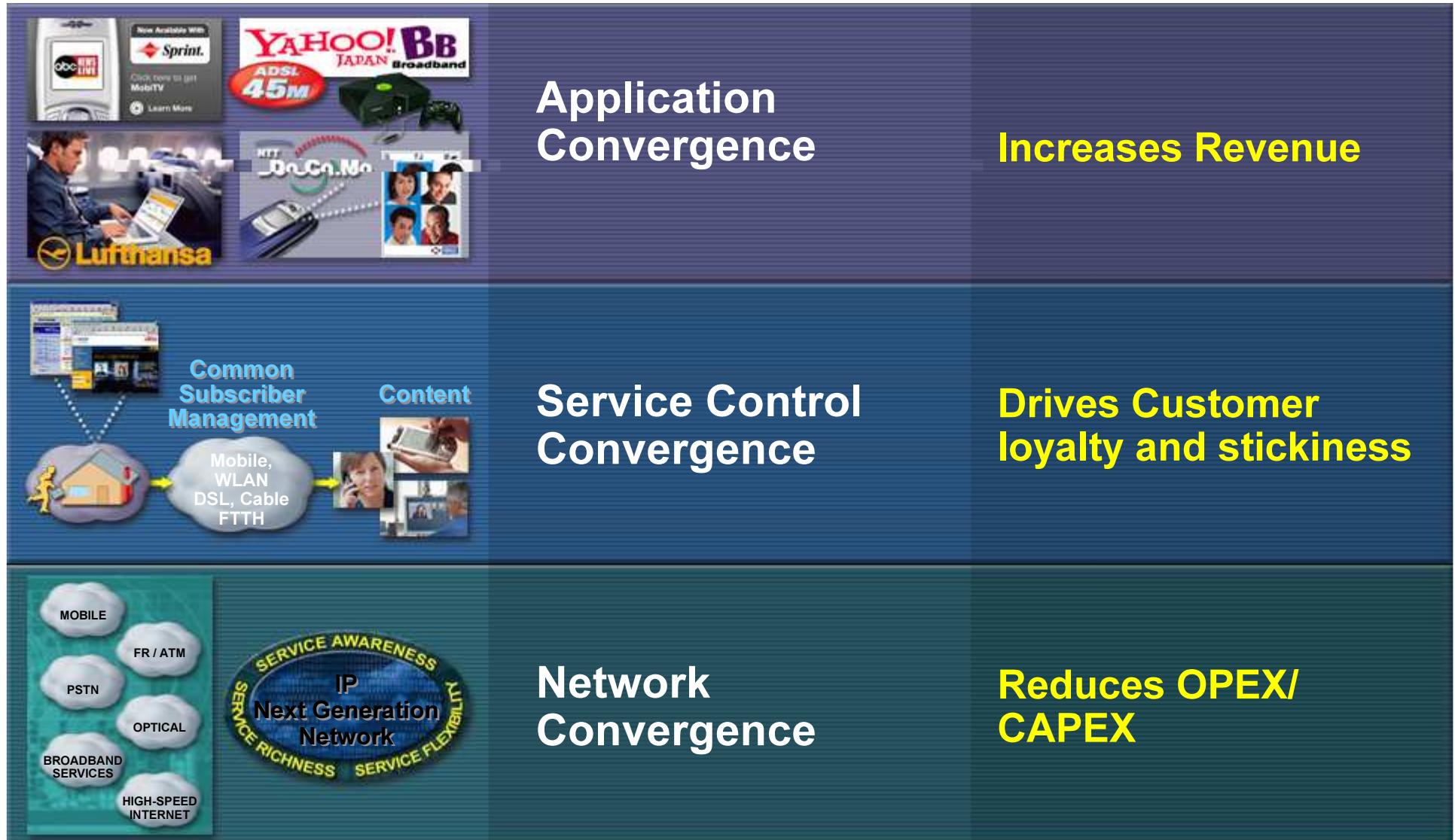
Local Roaming

Local Ads

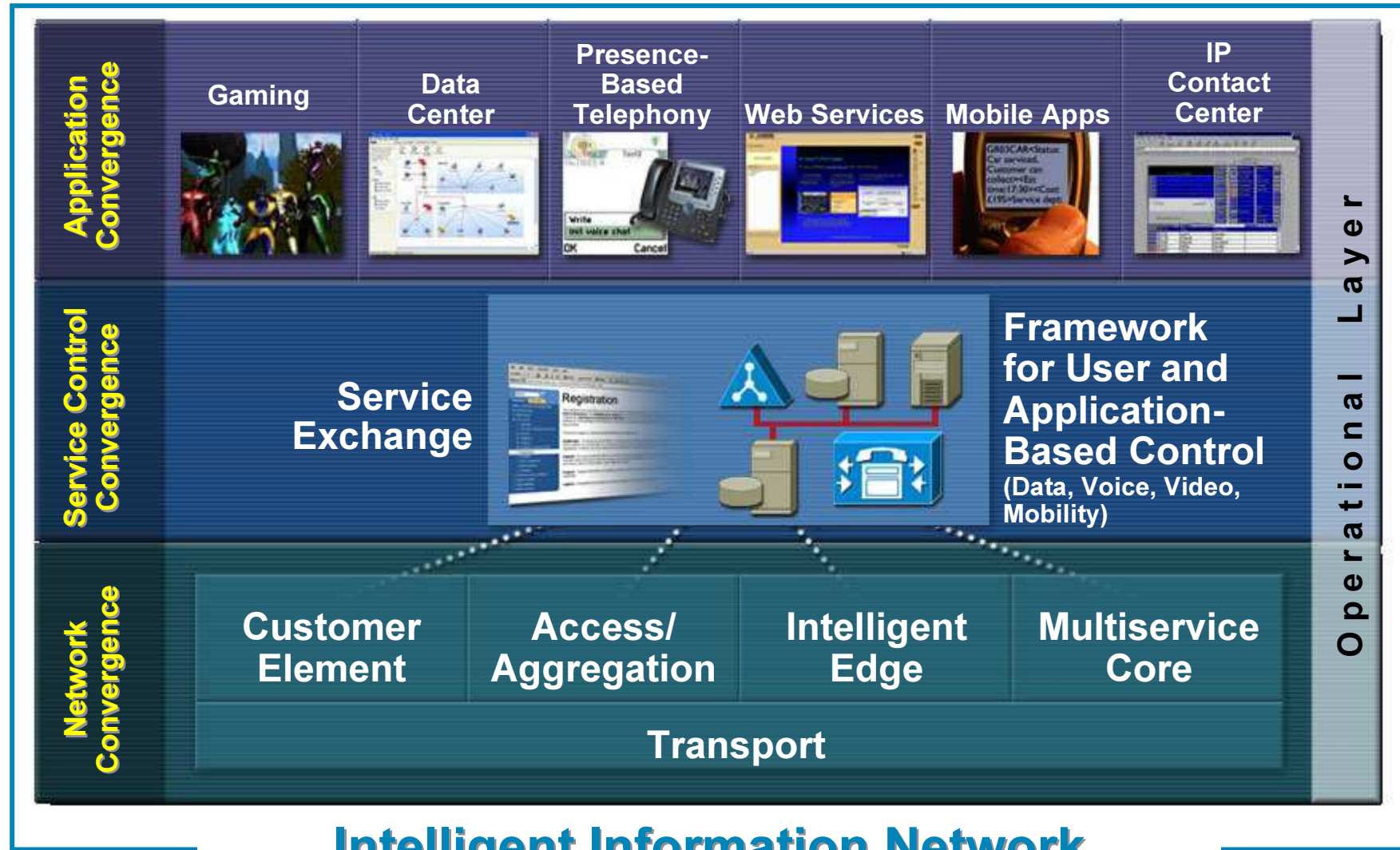
# Overview of Cisco ServiceMesh



# Layers of Convergence



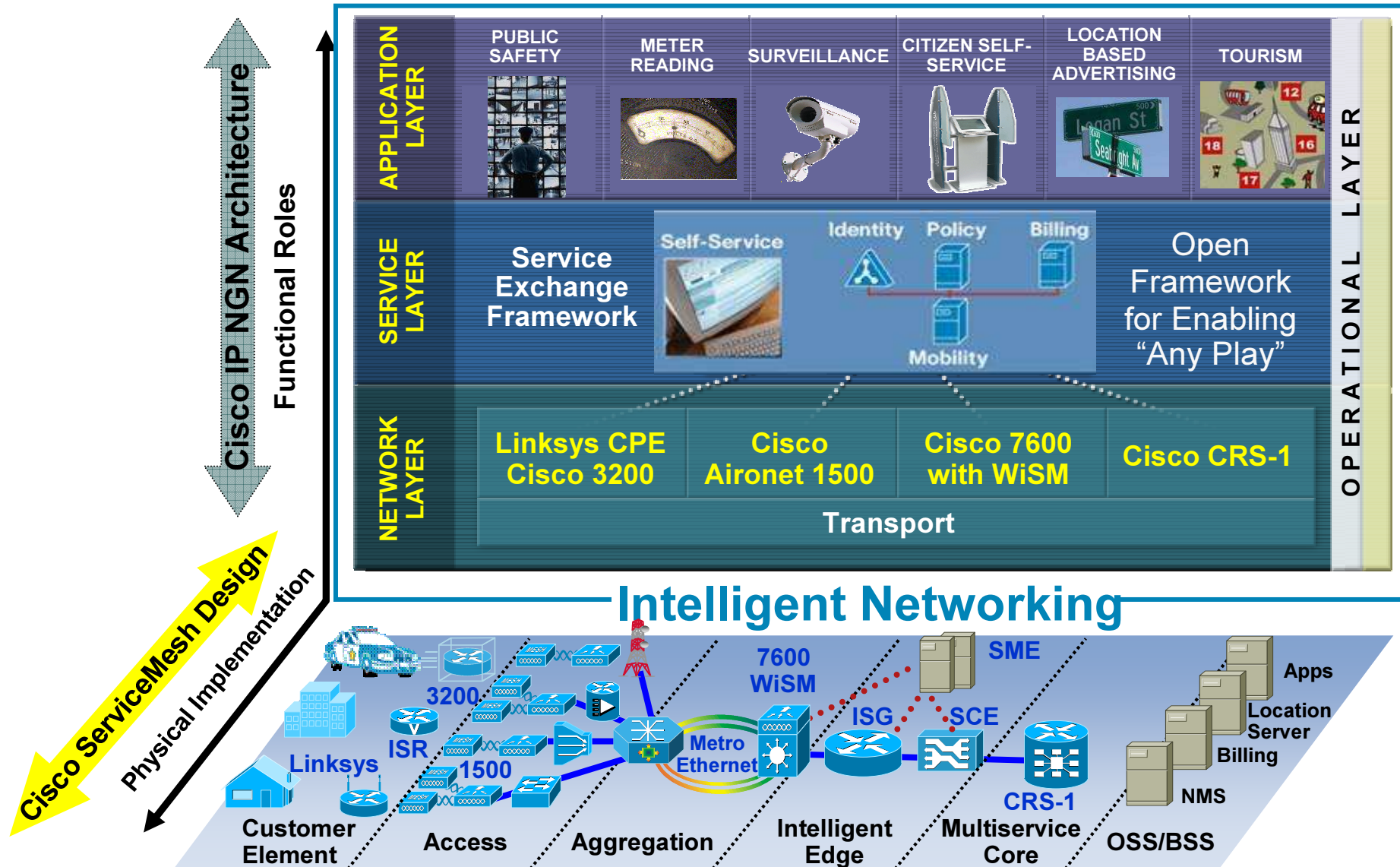
# Cisco IP Next-Generation Network (NGN) Architecture



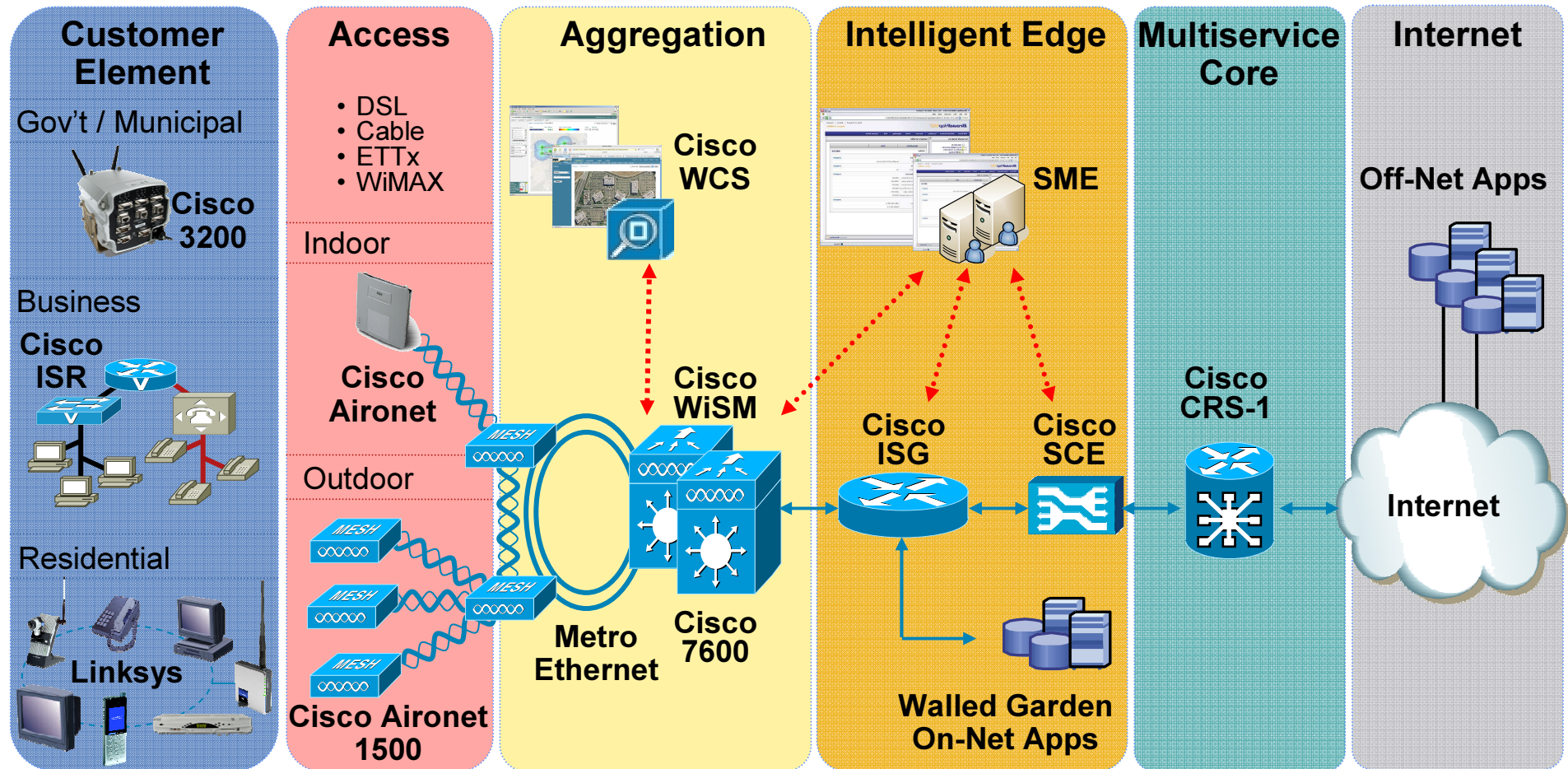
## Intelligent Information Network

# Cisco IP NGN Architecture and ServiceMesh Design

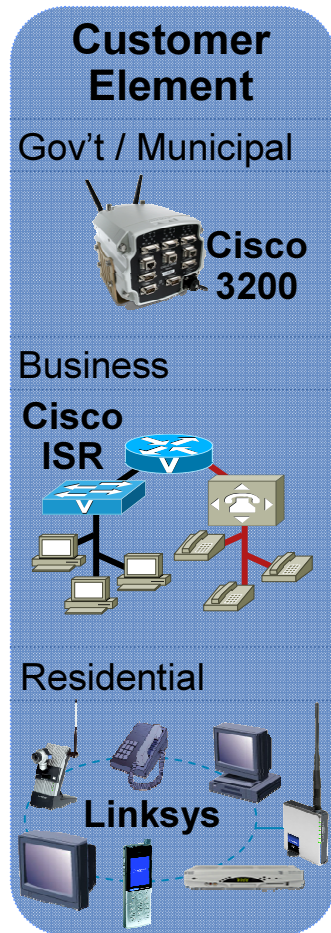
## Enabling Network Convergence



# Cisco ServiceMesh Design



# Cisco ServiceMesh – Robust Access



- **Cisco Compatible Extensions (CCX)**

- Reside in virtually every WiFi client worldwide
- Improved performance

- **Radio Resource Management**

- Detect and adapt to changes in air space in real time
- Optimal topology for wireless networking

- **Zero-Touch Configuration**

- Access points automatically detect and configure themselves with the controller
- Nodes join the network simply and securely
- Based on the Lightweight Access Point Protocol

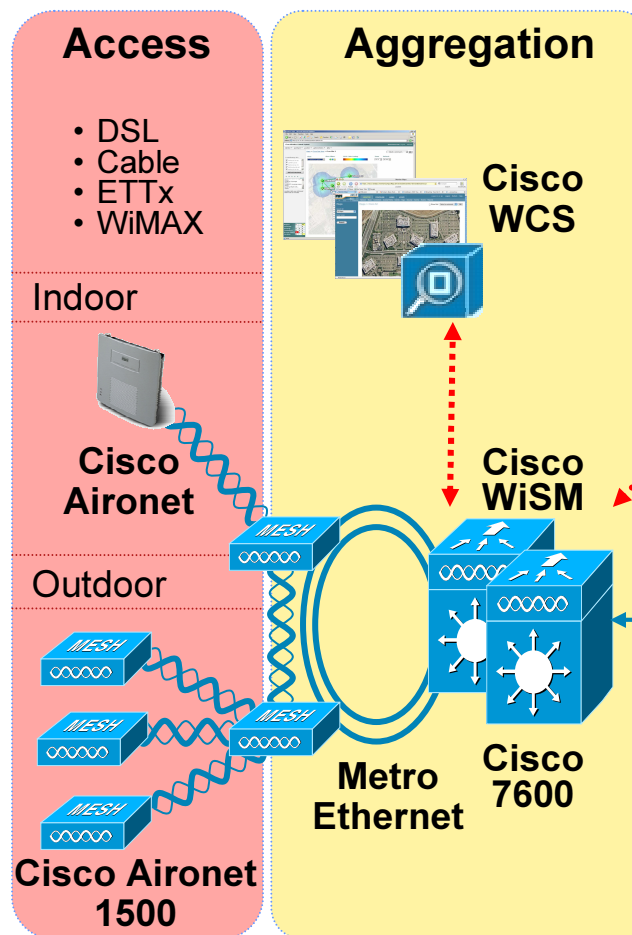
- **Intelligent Routing Algorithm**

- Establishes the best path through a mesh of wireless nodes to a wired gateway
- Based on the Adaptive Wireless Path Protocol (AWPP)

- **Unified Indoor/Outdoor Architecture**

- Manages both indoor and outdoor access points
- Provides system-wide monitoring of all access points
- Transparent roaming from indoor to outdoor.

# Cisco ServiceMesh – Carrier-Grade Aggregation



## ■ Network Convergence

- Cisco 7600 Series Router
- Aggregates traffic from multiple access networks
- Deliver consumer and business data, voice and video services over one converged network

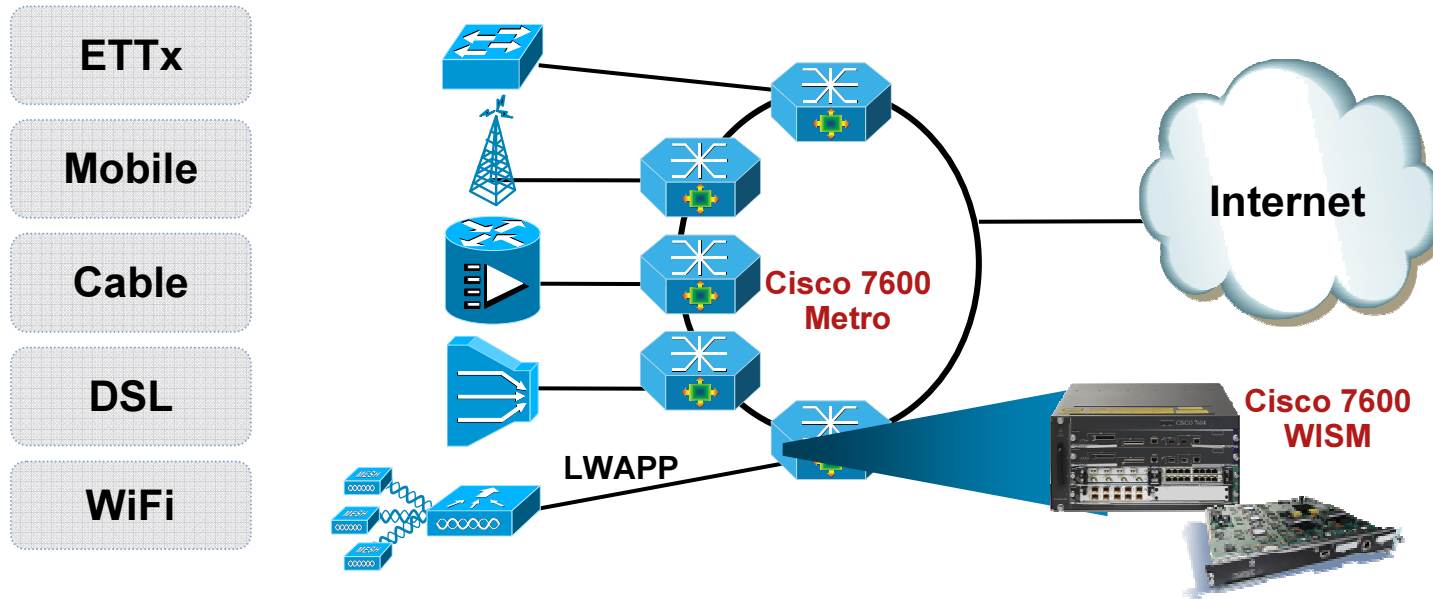
## ■ Seamless Roaming for QoE

- Cisco 7600 Wireless Services Module
- Scale and manage wireless networks as easily as wired
- Supports indoor and outdoor access points
- Security and QoS context information follow user wherever they roam

## ■ Centralized Configuration and Management

- Cisco Wireless Control System
- Plan, configure, manage, monitor and troubleshoot entire network from a single backend console

# Integrated 7600 Wireless Service Module (WiSM)



## Optimize CapEX and OpEX in the Metro:

- Network Convergence: WiFi, IP RAN, PDSN/GGSN and Carrier Ethernet in a single platform
- Supports indoor and outdoor access points, including mesh
- Seamless roaming across all service modules (mobile IP)
- Extensive integrated security capabilities (WPA2, EAP...)

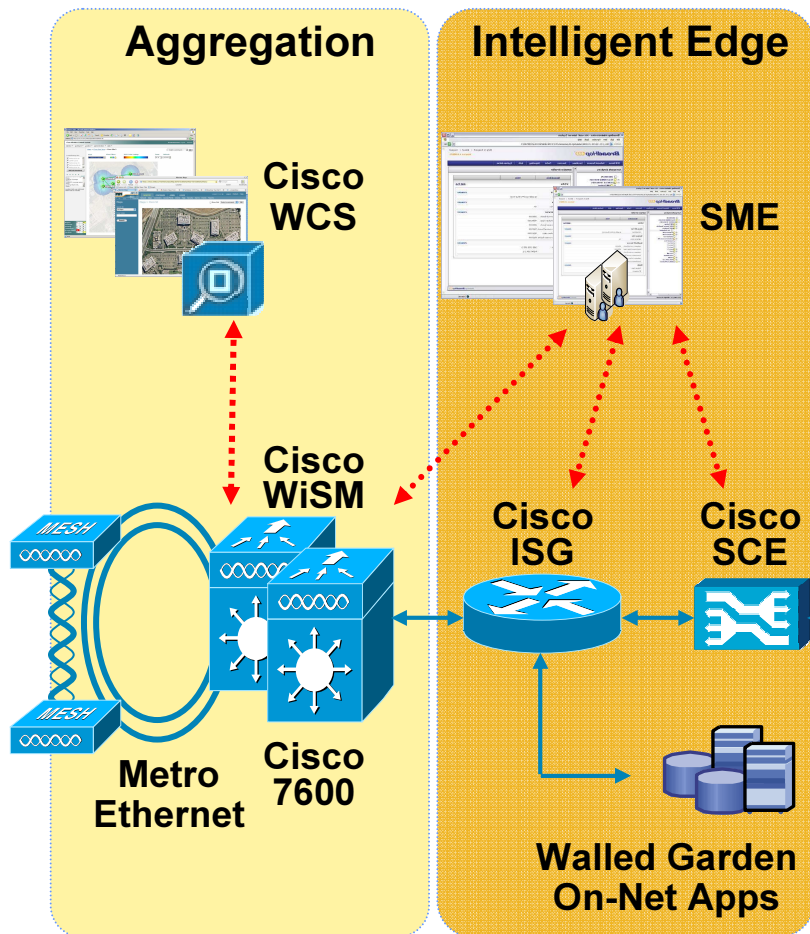
Customers





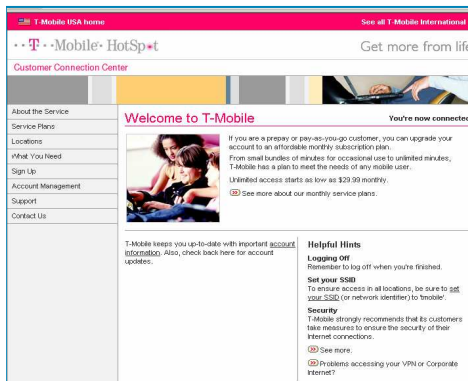
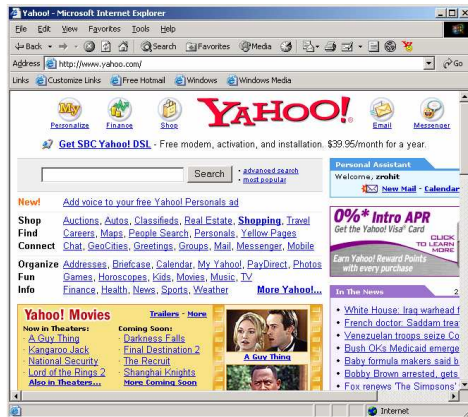
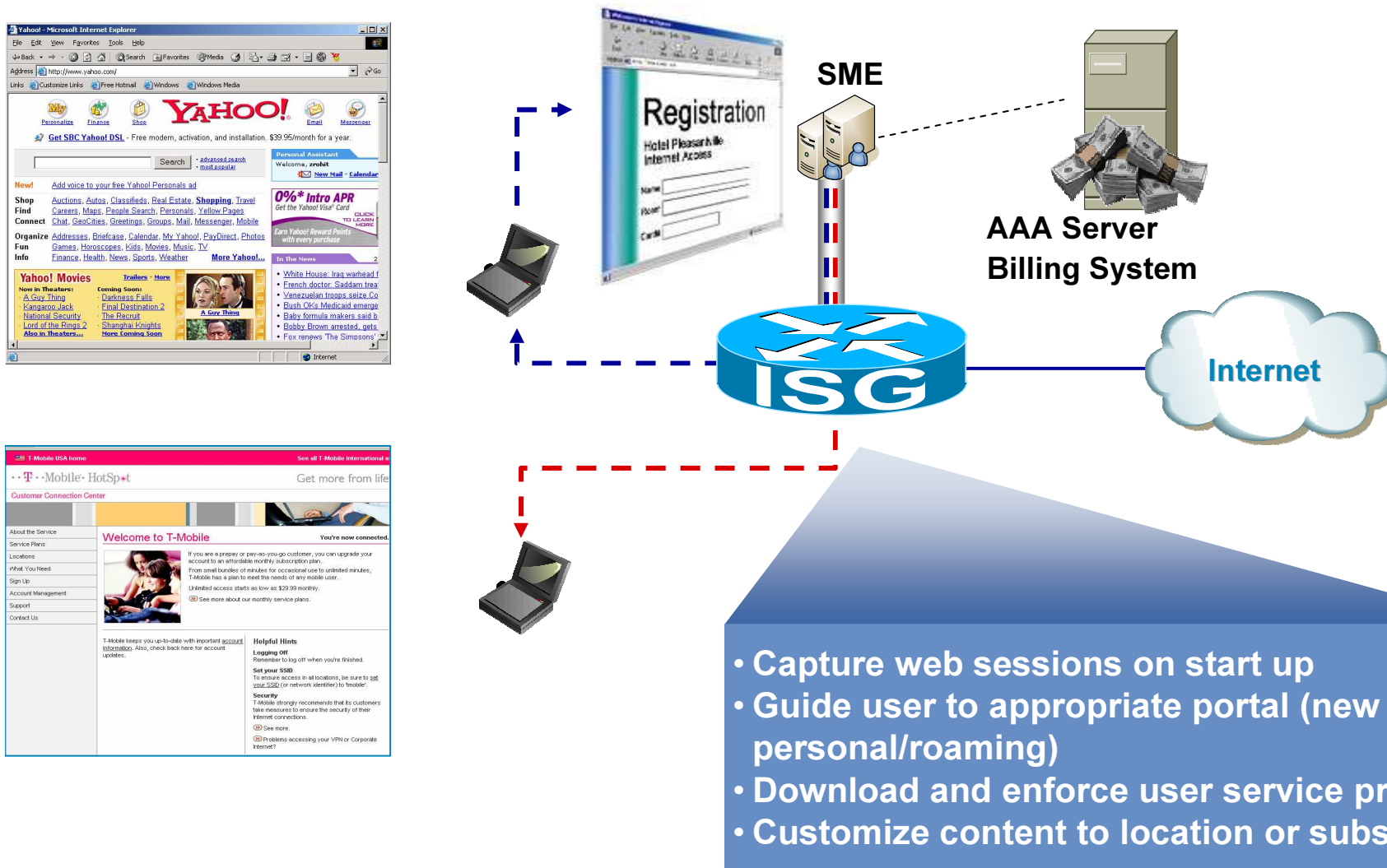
# Cisco ServiceMesh – Intelligent Edge

- **Manage access to the network**
  - Force user-logon and identification
  - Control blacklisting and other security
- **Differentiated services and user groups**
  - Serve Government, SMB and Residential
  - Prepaid, Postpaid, Corporate, Free access
- **Provision services**
  - Portal interface
  - Payment infrastructure
- **Ensure good end-user experience**
  - Ease of use / flexible service options
  - Priority for Voice>>P2P, Paid>>Free
- **Interconnect to other access networks**
  - Leverage installed base for backhaul
  - Extended services to existing subscribers

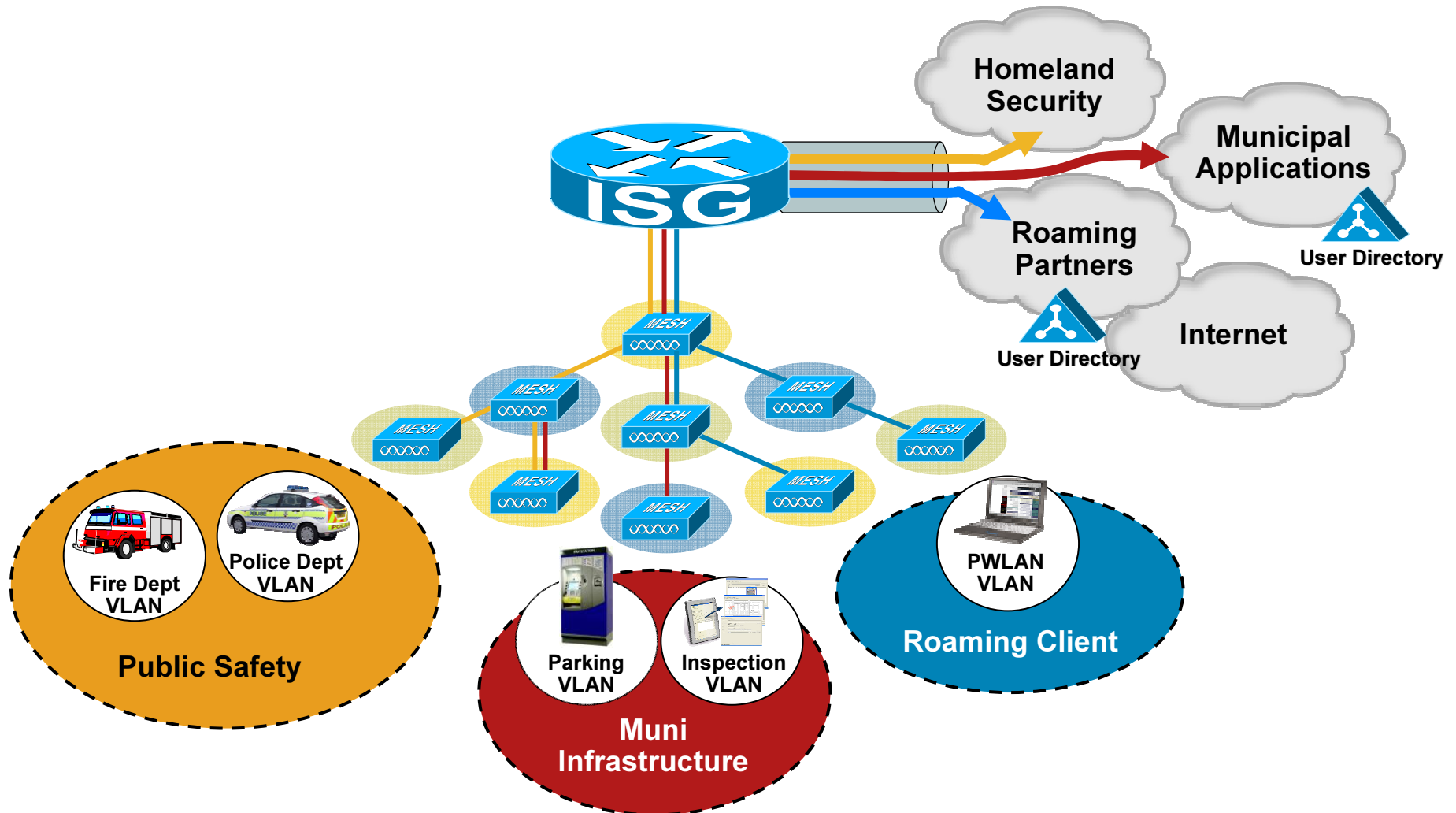


# Service Selection for Network Access

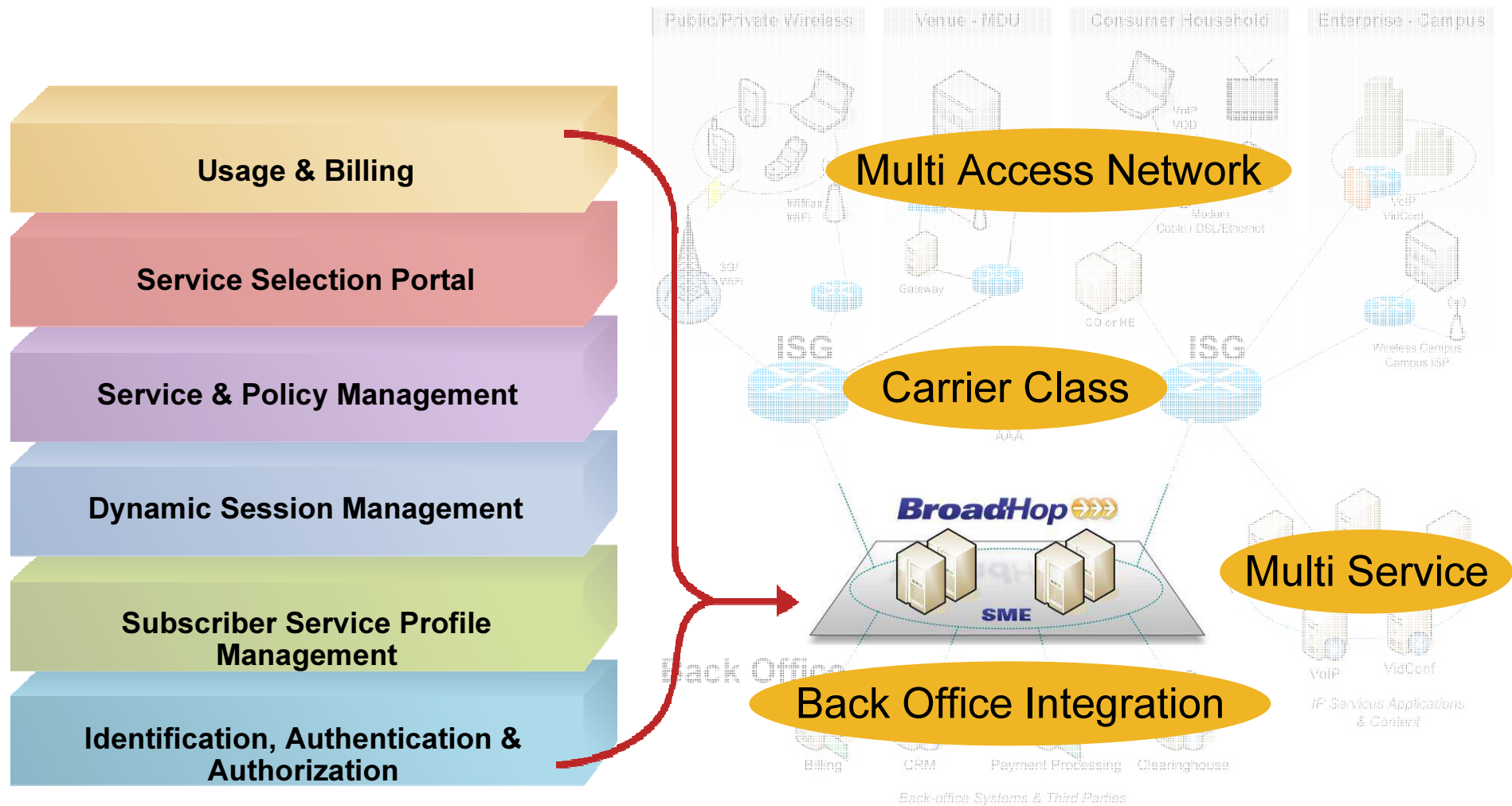
## Intercept Customers and Force Them to Log On



# ISG for ServiceMesh User Authentication



# Leverage SME For Subscriber Management Across Multiple Networks



# Residential Portal and Self Care

## Example of Service definition and enforcement

The screenshot displays the MEGACOM Networks website in a Microsoft Internet Explorer browser window. The address bar shows the URL `http://localhost:8110/broadhop/index1.htm`. The page features the MEGACOM logo and a navigation menu with links for "About MegaCom", "Troubleshooting Guide", and "Logout".

The main content area is titled "Welcome to MEGACOM" and greets the user as "JOHN CHAMBERS". It indicates the user is subscribed to the "Business Plan" and provides a message center notification: "MESSAGE CENTER - You have (0) unread messages. Upgrade your account today John Chambers Welcome to MegaCom!".

The "CUSTOMER CONTROL CENTER" sidebar on the left includes a date (Friday, December 17, 2004) and a list of service-related links: "About the Service", "Service Plans", "Download Center", "Sign Up", "Account Management", "Support", and "Contact Us". A promotional banner for a "\$1500 Gift Card" is also visible.

The central section highlights the "BUSINESS PLAN" as the most popular option, priced at "\$39.95 month". It lists included services such as "Unlimited Access", "1 IP Address", "4MB Down", "512 Uplink", "Pop Up Blocker", "Email", "P2P Capping", "Voice over IP", and "4 Phone Numbers". A "SIGN UP NOW" button is provided.

On the right side, there is an "Information Center" with a "SETUP YOUR VOICE OVER IP SERVICE..." banner. Below it, a "FAMILY PLAN" is advertised with features like "Voice Over IP", "Gaming", "Internet Security", and "Parental Controls", accompanied by an "UPGRADE NOW" button. Further down, a "THIS IS CISCO ON THE MOVE" banner is visible, along with a "powered by BroadHop Services Management Platform" logo.

# Residential Portal and Self Care

## Example of Service definition and enforcement

The screenshot shows a Microsoft Internet Explorer browser window displaying the MEGACOM NETWORKS website. The address bar shows the URL: `http://localhost:8110/broadhop/select_service_pc.do?service=service.1&Submit=Add%2FRemove`. The page title is "Configure Account Settings" and it is for a "JUNIOR'S ACCOUNT".

**MEGACOM NETWORKS**

**Configure Account Settings**  
**JUNIOR'S ACCOUNT:**  
Restrict URLs, limit time, use preset content filters and add prepaid funds to the account using Internet Allowance™.

**BROADBAND ACCESS PARENTAL CONTROLS:**  
MegaCom provides you with the following preset filters to help quickly restrict access.

- Full Internet Access
- MegaCom Walled Garden
- Pre-Teen Restricted
- Teen Restricted

**TIME RESTRICTION:**  
Restrict Access for specific time of the day or limit access to a set amount of time.

**Start:** 10 : 00 PM **End:** 07 : 00 AM

**Max Time per day:** 02 Hours 00 Minutes

**INTERNET ALLOWANCE :**  
Add funds for gaming, music and more. Funds can be added on a one-time or recurring basis.

\$ 20  One-Time  Monthly  Annually

**CUSTOMER CONTROL CENTER**  
Friday, December 17, 2004  
[About the Service](#)  
[Service Plans](#)  
[Download Center](#)  
[Sign Up](#)  
[Account Management](#)  
[Support](#)  
[Contact Us](#)

[Win a \\$1500 Gift Card](#)

Local intranet

# Residential Portal and Self Care

## Example of Service definition and enforcement

Microsoft Internet Explorer

Toolbar - Microsoft Internet Explorer

LOGOUT & QUI

1:54:27 remaining in your current session

» [KidZone Portal](#) » [FAQs and Help](#) » [Add More Time](#)

» **INTERNET ALLOWANCE: \$20.00 Remaining**

**KIDZONE!** Online Fun  
Log In | Register

**Welcome to KidZone!**  
Your source for online fun.  
Videos, music, games and more are all here for your enjoyment. Play the year's best games online with friends or sit back and watch the latest video. It's all here...

**Watch Your Favorite Videos**

THE O.C.  
WATCH THE WHOLE FIRST SEASON!  
BUY NOW

TOP 10 VIDEOS  
BROUGHT TO YOU BY Colgate MaxFresh

**MUSICZONE**  
ALL MUSIC - ALL THE TIME!  
Download Songs, Watch Music Videos and read all about your favorite artists

POP ROCK RAP COUNTRY

**TONY HAWK'S UNDERGROUND 2**  
Team Bam in a skate-it-all, wreck-it-all, prank-it-all World Destruction Tour. This time, it's not just about skating, it's about mayhem. Do you have what it takes?  
PLAY NOW!

**Play Games**

**OUR TOP DOWNLOADS:**  
Spider Man™ - DOOM 3™ - Shark Tale™ - X-Men Legends

**HALO COMBAT EVOLVED** PLAY ONLINE

<b>PUZZLE GAMES</b> 25 FREE GAMES	<b>QUICK GAME!</b> Ticke your brain with our games	<b>ACTION &amp; SPORTS</b> 24 FREE GAMES	<b>FAST REFLER!</b> Move faster, aim higher, score bigger
<b>DOWNLOAD GAMES</b> 85 OFFERS	<b>OWN IT!</b> Play your favorite game & own it!	<b>WORD &amp; TRIVIA</b> 20 FREE GAMES	<b>WORD-WIT!</b> Exercise your vocabulary every day
<b>PLAY FOR CASH</b> 26 DASH GAMES	<b>WIN MONEY!</b> Play against others for real cash	<b>POP CULTURE</b> 11 FREE GAMES	<b>HIP, AND HOT!</b> Celebrities, TV, movies and more!

Local intranet

# Residential Portal and Self Care

## Example of Service definition and enforcement

The screenshot displays a multi-windowed Microsoft Internet Explorer browser. The primary window shows a page titled "Broadband Services" with the address "http://localhost:8110/broadhop/halo.htm". The page content includes a "HALO COMBAT EVOLVED" banner, a green confirmation message "YOUR MULTI-PLAYER HALO ACCESS HAS BEEN SUCCESSFULLY ACTIVATED!", a "Start Playing Now" button, and instructions for playing Halo online. A "MegaCom KidZone Toolbar" is overlaid on the page, showing a "Broadband Toolbar" with a "LOGOUT & QUIT" link, a session timer at "1:49:9 remaining in your current session", and a remaining internet allowance of "\$17.01 Remaining".

Address: <http://localhost:8110>

Address: <http://localhost:8110/broadhop/halo.htm>

**YOUR MULTI-PLAYER HALO ACCESS HAS BEEN SUCCESSFULLY ACTIVATED!**

[Start Playing Now](#)

PLEASE

Put your skills to the test and connect with players across the world by enjoying the online multiplayer features that Halo has to offer.

To begin playing, choose the multi-player option from the Halo main menu and then select an available server. You will then be ready to go.

Our online servers are designed to run with the latest official updates for the PC version of Halo. While our servers are 100% accessible and enjoyable by owners of Mac Halo, it will only work if both the server and client are running compatible versions of the game. Please note that updates for Mac Halo can occasionally

**KIDZONE!**

**Broadband Toolbar** [LOGOUT & QUIT](#)

**1:49:9 remaining in your current session**

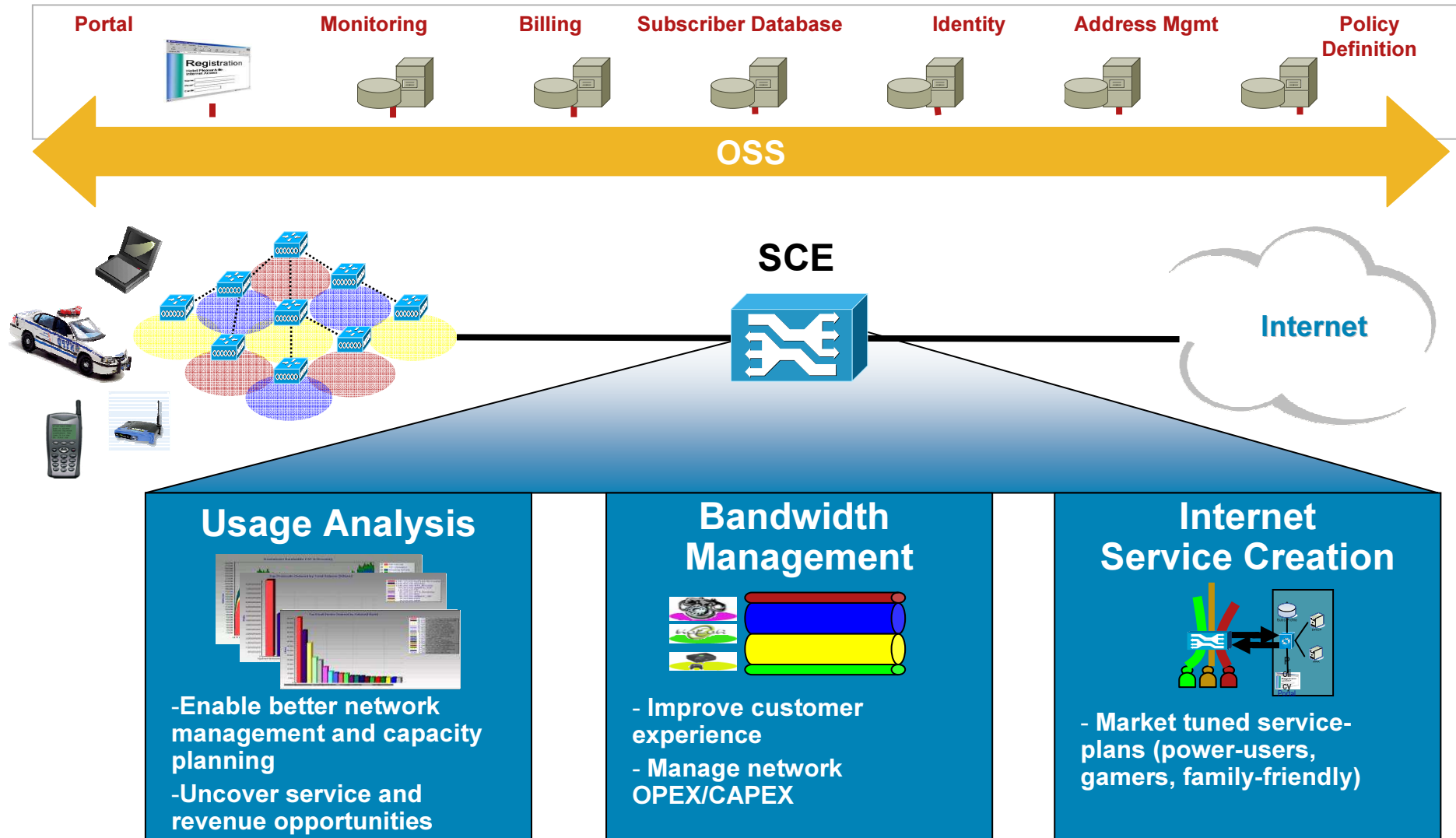
» [KidZone Portal](#) » [FAQs and Help](#) » [Add More Time](#)

» **INTERNET ALLOWANCE: \$17.01 Remaining**

Done Done Local intranet

# Service Control In a ServiceMesh Network

## Application Layer Visibility & Control



# Refined Level of Service Offerings

*SCE: differentiate service plans based on applications*

## Free Surf

Subscriber acquisition with light 'preview' service

- Web/Email—3mpbs, One GB monthly allowance (64kbps back off)
- P2P, Video DL—64kbps, 10Mbps

## Secure Access

Increased ARPU from add-ons

- Parental control for Web access
- Application Filter—User can disallow use of certain apps from accounts

## Premium Gaming

Increased Stickiness & Loyalty for Power Users

- Highest speed bandwidth
- Prioritized gaming traffic

***And much more—voice, video, etc.***

# ServiceMesh Security Technology

## Application and User Security

- Secure web login for portal and network access
- IPSec tunneling for secure access to applications and corporate domains
- Virus mitigation
- Quarantine enforcement

## Network Security

- Ongoing monitoring of unauthorized attacks
- Virtual separation of customer domains using VLANs

## Physical Security

- Access points traffic encryption of Mesh links
- Layer 2 network authentication and blacklisting

# Applications & Deployments



# Cisco ServiceMesh Applications



## Municipal

- Public safety (video&voice)
- Land management
- RFID tracking applications
- Surveillance
- Meter reading (utility/parking)
- Traffic management



## Residential

- Data connectivity
- Choice of payment method
- Turbo-button
- Family member additions
- Parental Control
- Location-based applications



## Businesses

- Data connectivity
- Guest access
- Hospitality offerings



## Tourism

- Convention directions
- City events and sightseeing
- Emergency help

# Public Safety

## *Cisco IP-based Video Surveillance*



Centralized management of video streams, recording, and retrieval

Lower operational costs via a single secure multi-service IP network

Open IP-based platform capable of supporting third party analytics software and appliances

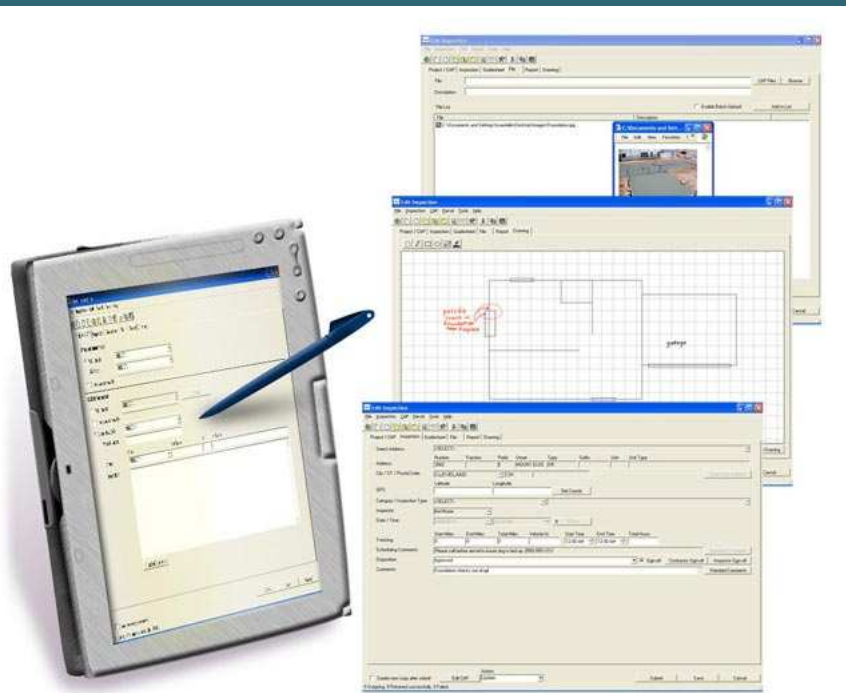
Efficient use of network bandwidth via IP multicasting

Any-to-Any-for-Any IP Video Surveillance Solution

Multi-Protocol IP Gateways and virtual matrix switching software

# Field Mobility Land Management

## Accela



- Keep valuable field staff on-site
  - Create new inspections
  - Cancel, reschedule, or reassign inspections
  - Sign-off inspections
  - Review case, application, or permit summary
  - Create new case, application, or permit with new inspection
- Access information immediately throughout system
- Increase productivity with less travel time
- Utilize off-line capabilities when in a remote area

# Remote Sensing: RFID

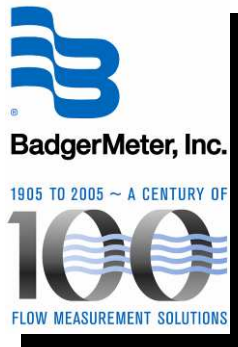
- Is the water safe?
- What just happened around the corner?
- Where are my people, vehicles, assets?



**AeroScout: 600 foot range, long battery life**

# Cisco Technology Developer Program

## *Trusted Application Partners*



# Closing Thoughts



# Wireless Mesh Networking

## *Customer Summary Check List*

- **End-to-end, wireless/network management**
- **Scalable Network Architecture**
  - Robust RF wireless routing
  - Robust fixed line network
- **Flexible back-end system**
  - User self provisioning
  - Authentication and Billing
  - Per user profiles
  - Roaming
- **Flexible client options**
  - Mobile
  - Residential
  - Disaster recovery
- **Network security**
  - Integrated wireless IDS
  - Rogue AP protection



# How Does Cisco ServiceMesh Benefit Service Providers?

