Small Cells

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Mobile Usage Has Changed Radically
Increasing Proportion of Indoor Usage

The original design…

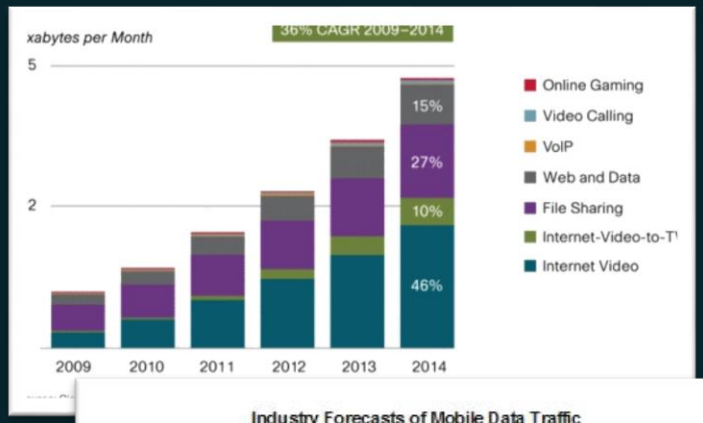
- Few, high-end users
- Voice calls
- Mostly outside
- Predictable usage patterns

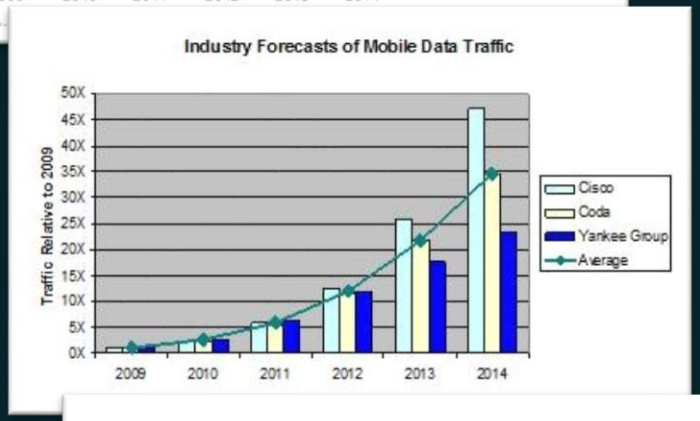
…& how it turned out

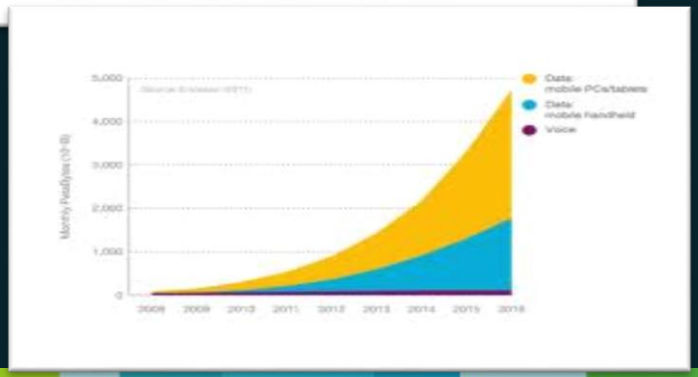
- Everyone's on it
- Mostly data – & lots of it
- 80%+ indoors*
- Very unpredictable

*Source: Cisco IBSG: A New Chapter for Mobile

The Data Storm Keeps Growing





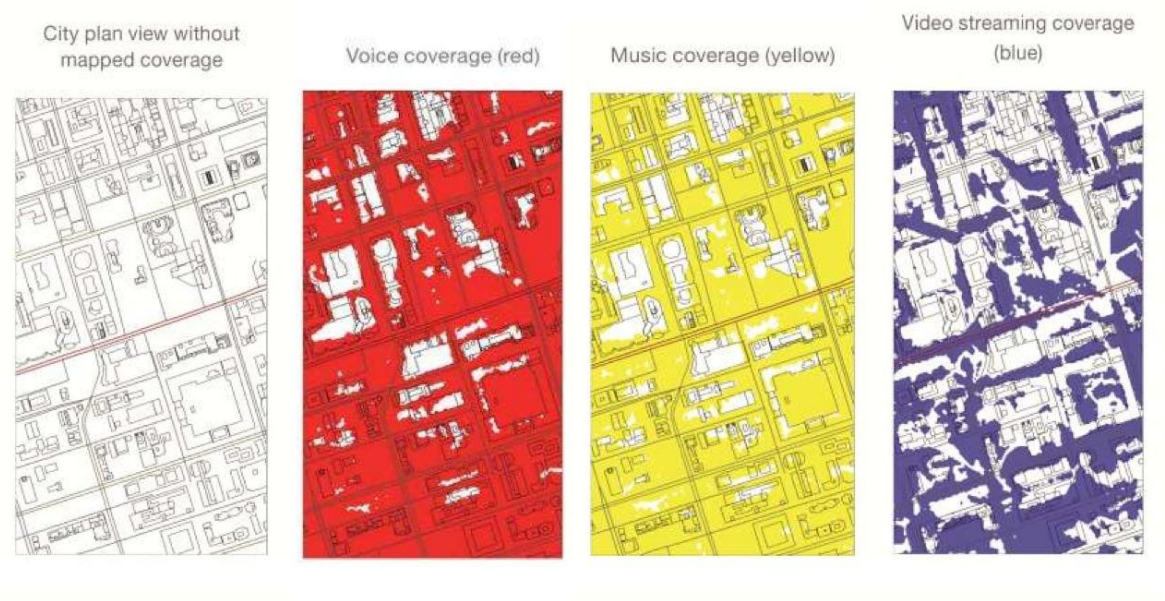


Humans consume ever more capacity

Indoor services – coverage/capacity

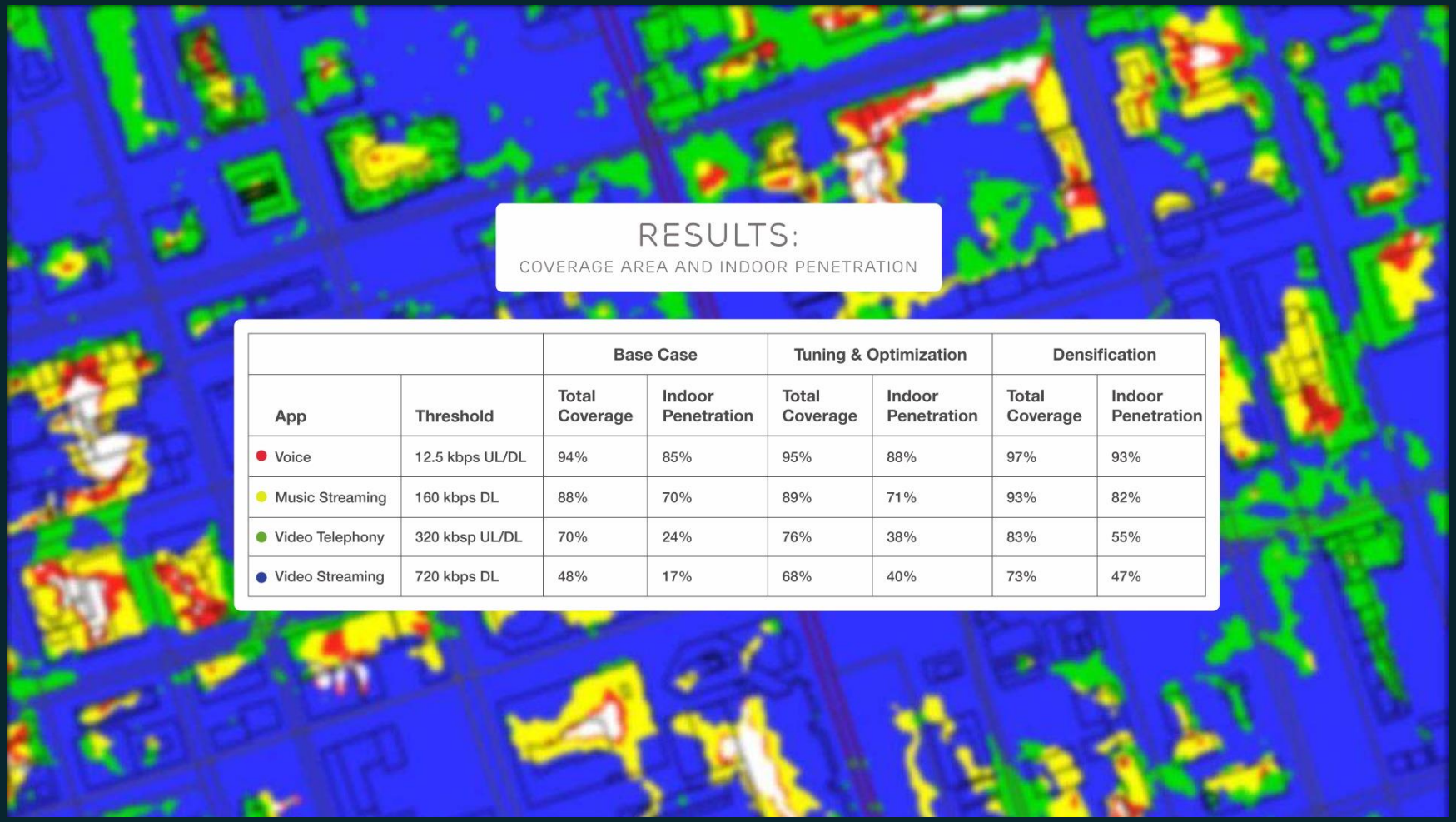
APP COVERAGE

- It's an app centric world
- User want reliable access for their apps wherever they go in the network
- App coverage requires a true end-to-end approach to design, build and run mobile networks



"Every app has its own coverage map"

Indoor services – coverage/capacity



RESULTS:

COVERAGE AREA AND INDOOR PENETRATION

		Base Case		Tuning & Optimization		Densification	
App	Threshold	Total Coverage	Indoor Penetration	Total Coverage	Indoor Penetration	Total Coverage	Indoor Penetration
Voice	12.5 kbps UL/DL	94%	85%	95%	88%	97%	93%
Music Streaming	160 kbps DL	88%	70%	89%	71%	93%	82%
Video Telephony	320 kbsp UL/DL	70%	24%	76%	38%	83%	55%
Video Streaming	720 kbps DL	48%	17%	68%	40%	73%	47%

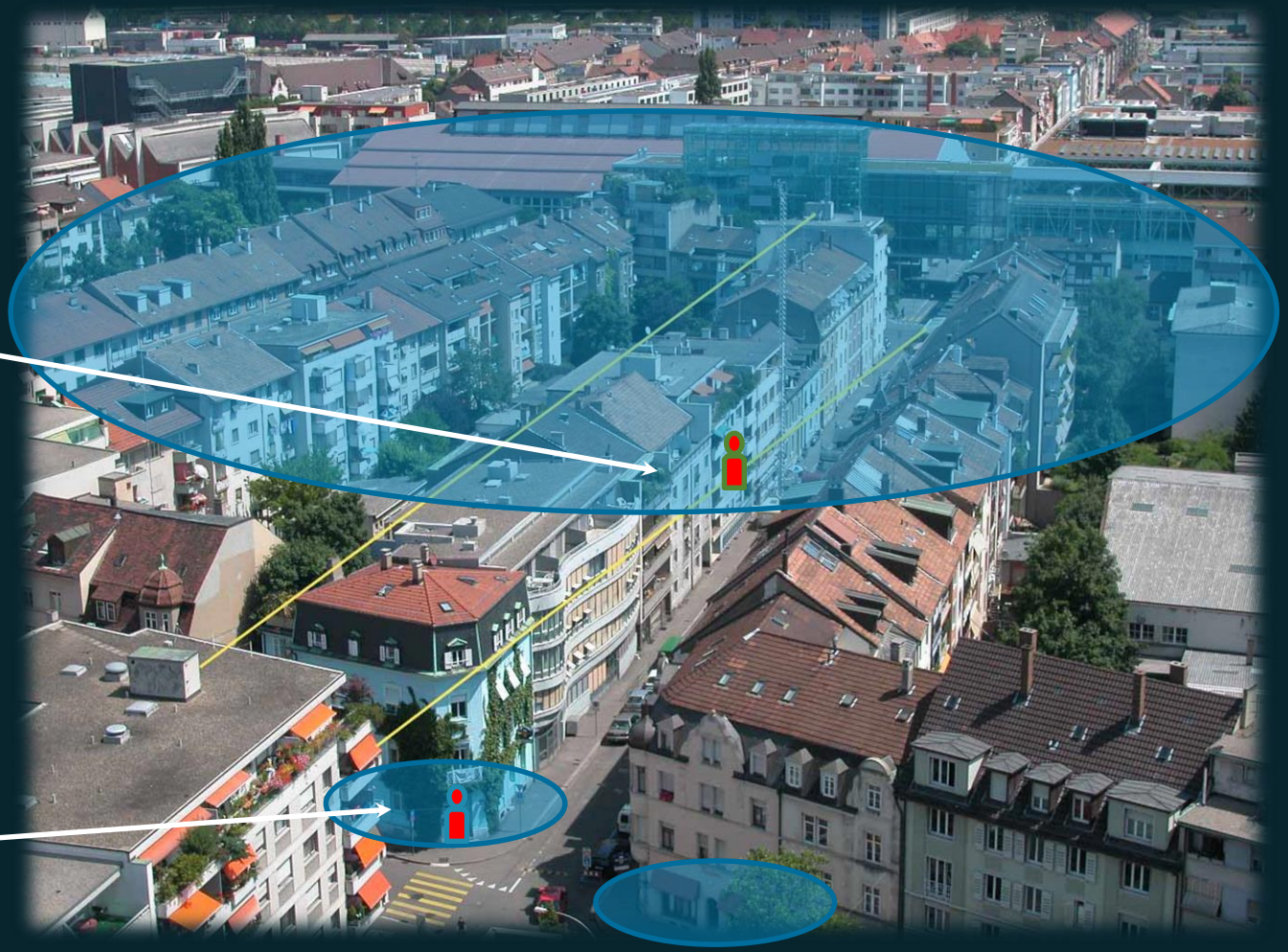
Gaining Capacity: “Outside-In” vs “Inside-Out”

Classic “Outside-In” Deployment

…indoor users are cell edge users
…only 30-35% traffic served outdoors
…cell sites are now scarce and costly

“Inside-Out” deployment

…80% usage indoors
…users well served
…costs low
…backhaul/site cheap



So we believe “inside out” makes most sense to increase capacity

CIOs Are Very Interested in Mobile

CIOs Are *Very* Interested in Mobile

CIO Technologies	Ranking of Technologies CIOs Selected as One of Their Top Five Priorities in 2013				
Ranking	2013	2012	2011	2010	2009
Analytics and Business Intelligence	1	1	5	5	1
Mobile Technologies	2	2	3	6	12
Cloud Computing (SaaS, IaaS, PaaS)	3	3	1	2	16
Collaboration Technologies	4	8	11	5	
Legacy Modernization	5	6	7	15	4
IT Management	6	7	4	10	*
Customer Relationship Management	7	8	18	*	*
Virtualization	8	5	2	1	3
Security	9	10	12	9	8
ERP Applications	10	9	13	14	2

*Not an option in that year

Source: Gartner, 2013 CIO Survey, January 2013

Gartner

Indoor Small Cells Require Vertical Market Understanding

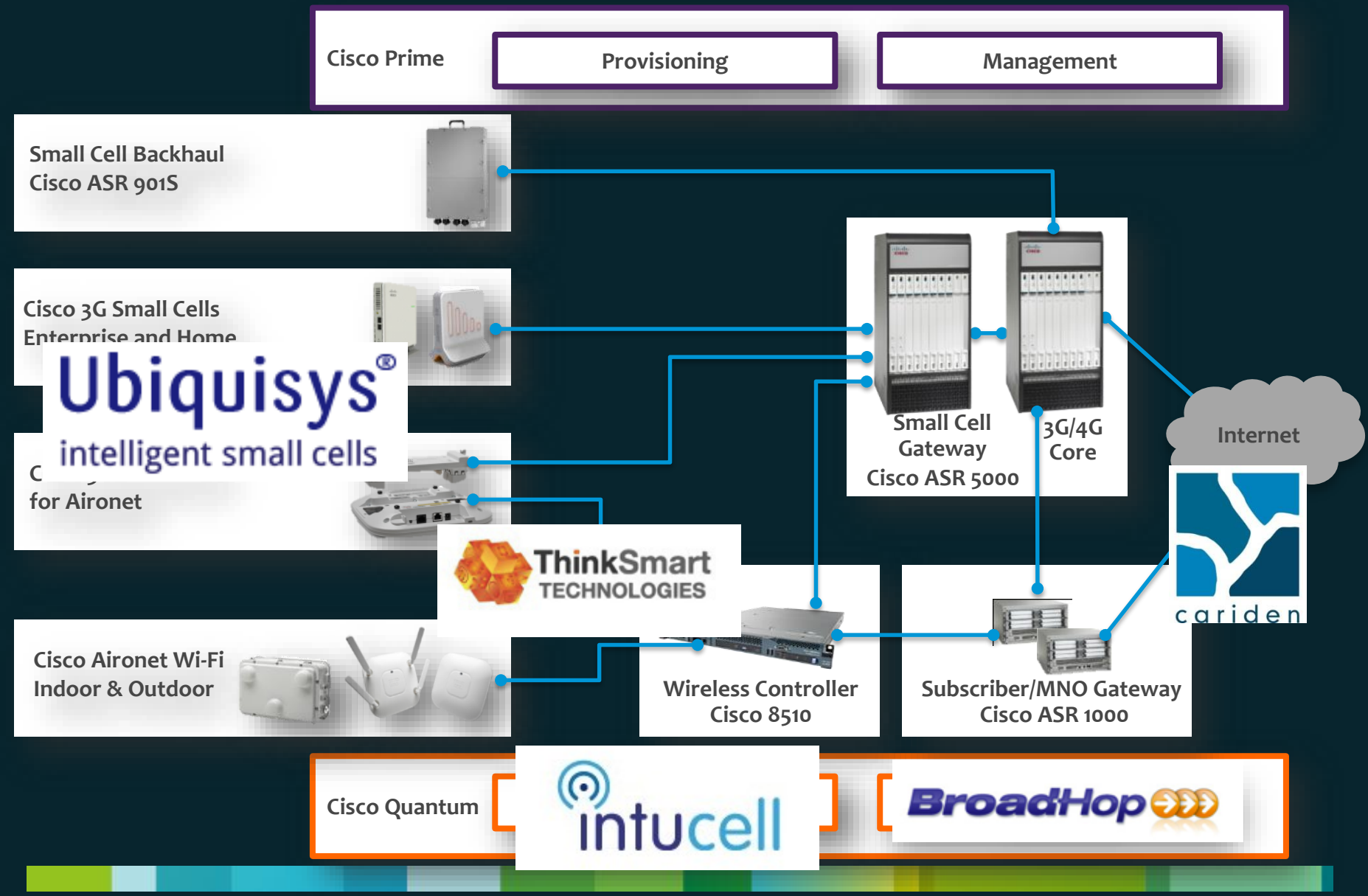
Education / Campus

Retail / Shopping Mall

Healthcare / Hospital

Hospitality / Hotels

Cisco now has a complete E2E solution



Self-Organizing Enterprise Small Cells

The enterprise mobility challenge

- CIOs need total indoor coverage for their mobility strategy
- But most service providers only offer big-building, big-budget DAS
- Need a simpler, low-cost solution that starts small and can grow

The solution: make it like Wi-Fi

- Low entry cost: low install cost, low running costs
- Just add cells to fit any size or shape
- That auto-discover and self-organize
- Resilient, automatic operation
- Commercially deployed today

Small cell key features

- Small cells match or exceed macro features and KPIs
- Requires new generation of high-availability software
- Requires resilient, automatic operation:
  - Auto frequency distribution
  - Auto power control
  - Auto neighbor relations
  - Auto load balancing

60,000 typical transactions per hour per small cell in downtown Tokyo and Seoul

Power/Backhaul/Real Estate Solved
Featuring Zero Touch Provisioning

Fully integrated, high performance, low cost 3G small cell for voice, data and messaging services:

- Reduced network costs and operations with integrated design
- Reduced CapEx through reuse of Ethernet connection and power
- Install, power-up and go with zero touch configuration & provisioning
- Secure, carrier-grade 3G base station technology
- Standards-based Home Node B with specified Iuh interface

Cisco USC 5310

Cisco Aironet 3600

Cisco has deployed many small cell networks

- Most widely deployed small cells in the world
- Over 18 million Wi-Fi APs deployed, 55%+ share
- 200+ Service Providers using Cisco SP Wi-Fi
- Over 2 million Licensed Small Cells deployed

Why would Enterprises Pay for Small Cell?

- Mobile coverage / capacity value so important for customer services
- Much cheaper than alternative solutions
- Flexible solutions appealing due to changing Enterprise requirements
  - **Financial and Professional Services**
    …Mobile intensive
  - **Healthcare / Hospitals**
    …in-building emergency responders
  - **Retail / Shopping Mall**
    …Customer services / retail rental value
  - **Education / Campus**
    …student retention
  - **Hospitality / Hotels**
    …Customer connectivity / services

Thank you.