Mobile Cloud

The Next Growth Avenue for Service Providers

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Jakarta, April 2013

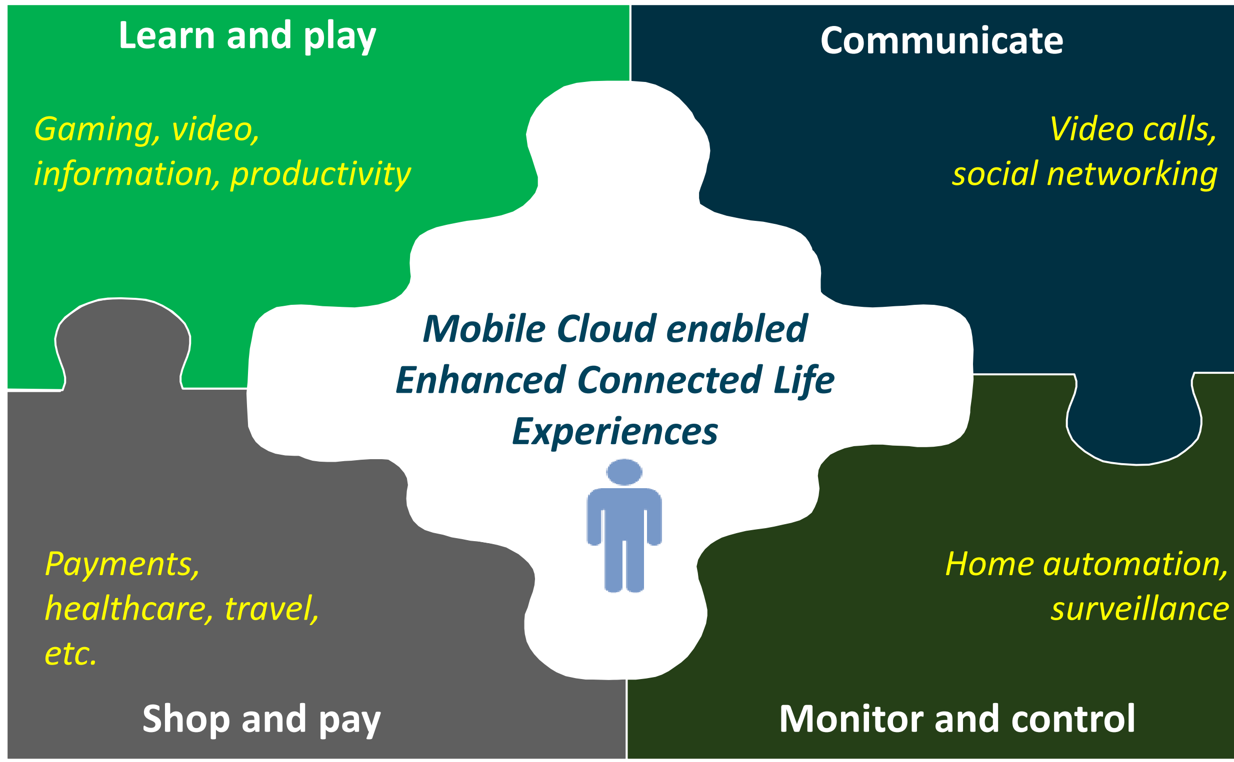
Consumers embracing convergence of Video, Cloud, Mobility – the *Mobile Cloud*

900 million Smart phones and tablets in use; **2 billion** by 2016

$960 billion Mobile services revenues today; **$1.2 trillion** by 2016

36% of mobile service revenues from Data today; **46%** by 2016

1.3 Exabytes / month Mobile data traffic today; **8 fold growth** by 2016[1]



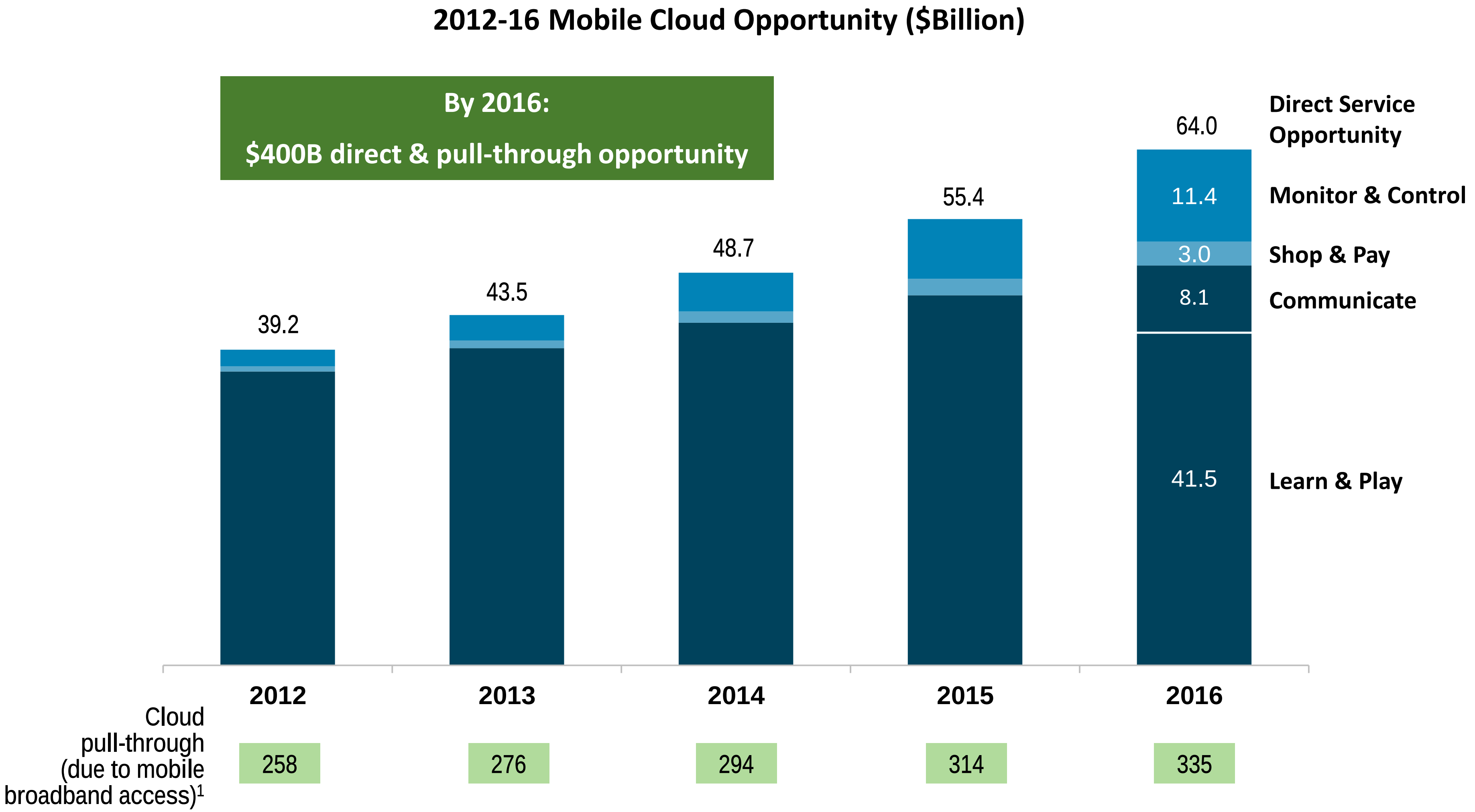
"Our mobile customers are looking to make their quality of life better", *President and CEO of AT&T Mobility*

"Our future may lay in a range of offerings that go well beyond mere mobile services — incl. Cloud and Internet of Things", *CEO of Telefonica*

1. ~2.5 times growth for fixed internet by 2016

Source: Cisco IBSG SP Analysis, Cisco VNI, IDC

By 2016, $64B Direct-Service Opportunity; $335B Broadband Pull-Through Potential



1. Cisco VNI: 70-80% of data traffic from video streaming, file/content sharing, online gaming, M2M addressable through mobile cloud

Source: Ovum, 2011; Gartner, 2011; ABI Research M2M, 2011; eMarketer 2012; IAB 2012; Cisco IBSG analysis

Powering Mobile Cloud Growth: Platform Convergence, Big Data, Immersive Interface

Example: Learn and Play Services

Current / near term	*Medium term*	*Long term*
• **Platform convergence** (managed/ unmanaged content, N-screen, linear / non-linear content) • Embedded '**Social**' **experiences** (in gaming, video, etc.)	• **Predictive intelligence enabled, push-based personalized services** (customer context, location, time, place)	 • **5-Dimensional (sight, hearing, touch, smell, taste) user interface for immersive experiences** • **Real-time interactivity and role plays with on-screen characters**

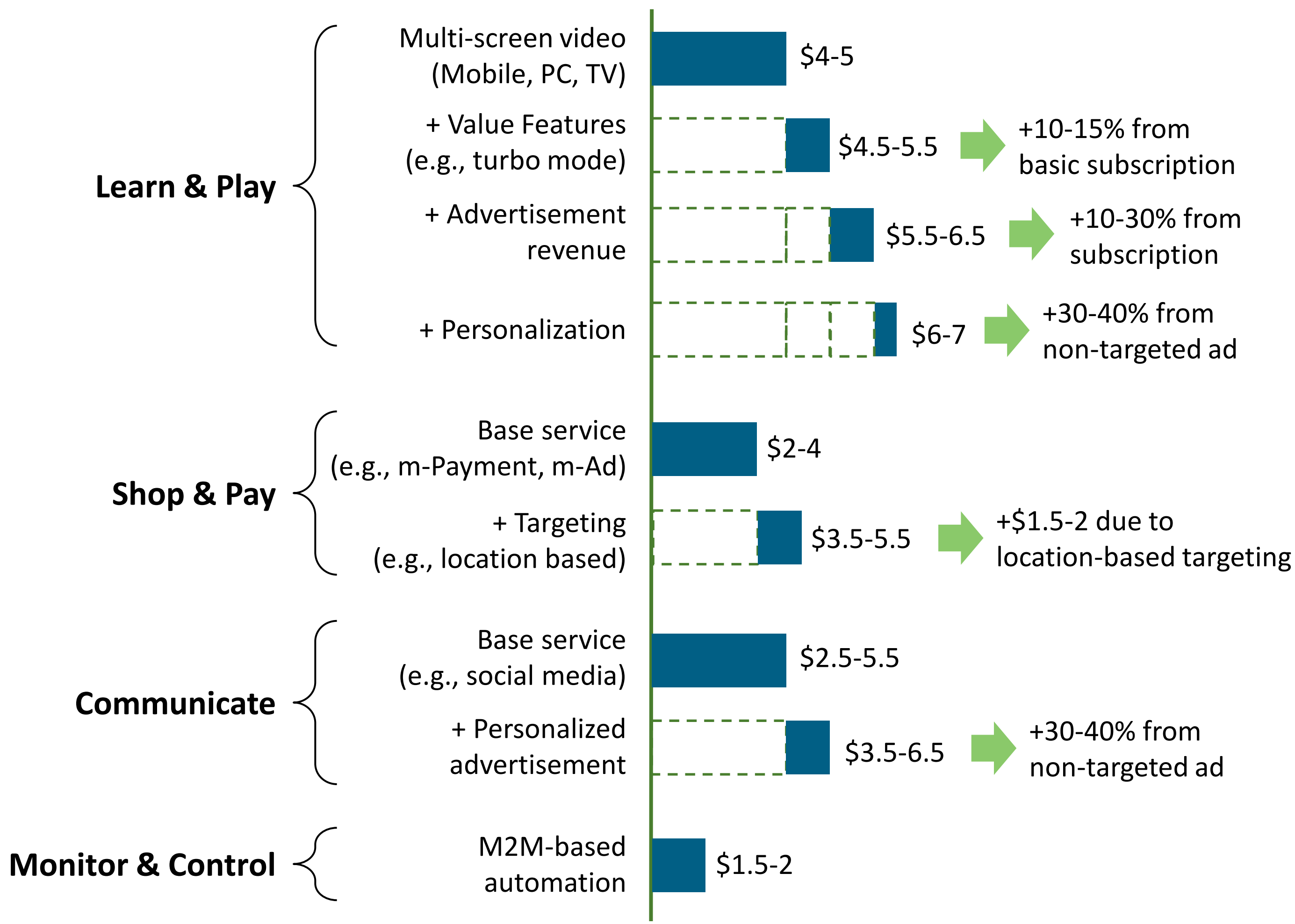
Selected innovations

• IP networks • Digital media cloud	• Big Data (customer and network side analytics)	• Human-Machine Interface (e.g. wearable devices) • Augmented reality

Source: Cisco IBSG SP

For SPs, Mobile Cloud Services Bring Up to $7 in Revenue per Dollar of CAPEX

What an SP's $1 of CAPEX in Mobile Cloud Service Can Bring



Note: Based on direct investment by major SPs in developed and developing markets for add-on services on top of broadband access

Source: Cisco IBSG, SP analysis

Reducing Costs Also Important as The End Goal is Increased Profitability

Profita-bility
- Grow Revenues
- Reduce Costs

Reduce Costs	Key Issues	Potential SP Actions
Data Center	What are the main drivers for data center cost reductions? How to reduce mobile data center costs?	Migrate to **cloud-based data center** to realize improved utilization, multi-tenant efficiency and economies of scale
IP Transport	How to cap (or even reduce) IP transport costs given ever increasing mobile data traffic?	Deploy **network / CDN caches** to reduce IP transport costs (and increase quality of service to end users)
Mobile access	Given prominence of mobile broadband services, how to address spectrum issues related to shortage and cost? Is there better alternative than today's RAN to deliver band-width hungry mobile services?	Consider **WiFi** to supplement 3G and 4G, especially in dense indoor areas
Customer acquisition	Can the mobile cloud paradigm reduce the costs related to customer acquisition?	By concentrating processing in the Cloud, mobile providers can **reduce potential device subsidies**

Source: Cisco IBSG SP

Optimizing Key Revenue and Cost Components Can Improve Profit by 50%

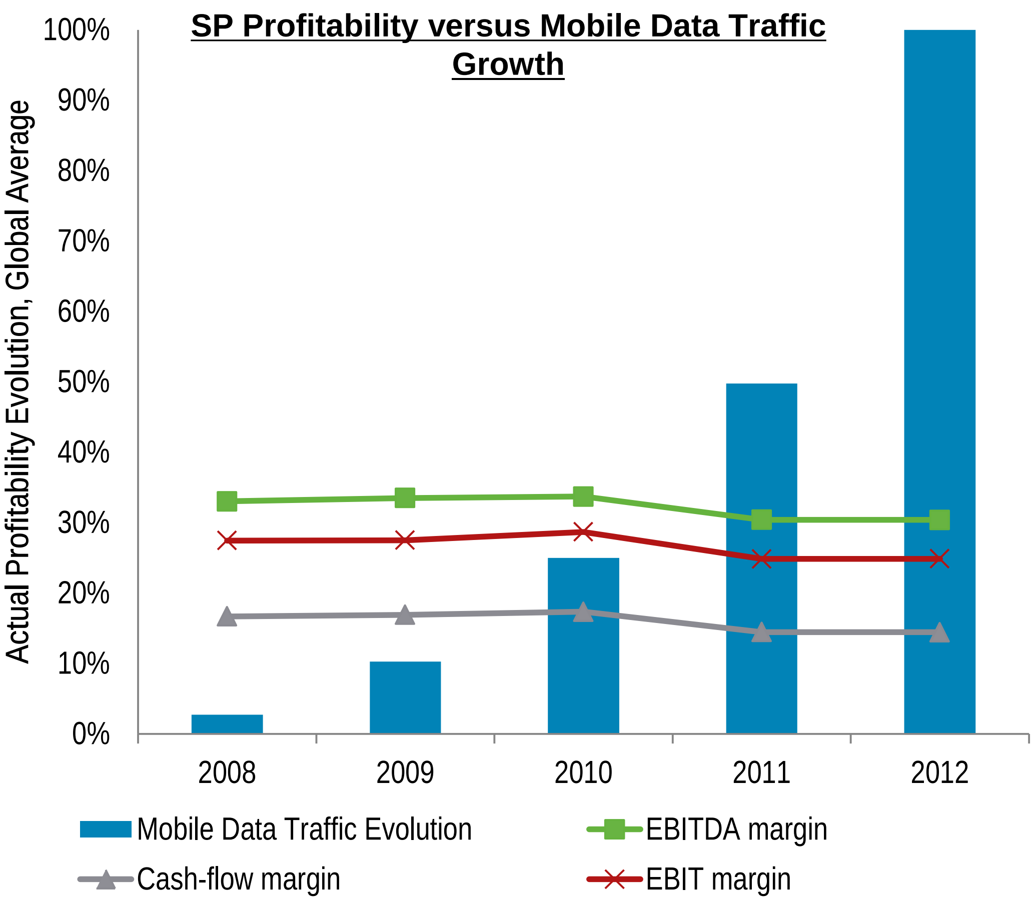
- **Profitability**: ↑ 40-50%
  - **Grow Revenues**: ↑ 30-40%
  - **Reduce Costs**: ↓ 10-15%[1]

		Description	Value of Lever
Grow Revenues	Subscription	Paid revenue from users for services	↑ **10-15%** by pricing to customer value
Grow Revenues	Advertisement	Revenue from advertisers/agencies or revenue share from content providers	↑ **15-20%** of subscription revenue
Grow Revenues	Personalization	Add-on revenue from offering targeted ads / content	↑ **5-10%** of subscription revenue (30-40% of ad revenue)
Reduce Costs	Data Center	Cost to build and operate cloud-based data center	↓ **30-50%** from DC cost via virtualization
Reduce Costs	IP Transport	Cost to transport content/apps throughout network	↓ **5-10%** via optimized CDN caching
Reduce Costs	Mobile access	Cost to build and operate mobile access network	↓ **30-80%** of access platform cost by using Wi-Fi vs. 3G/4G[2]
Reduce Costs	Customer acquisition	Cost to lower entry barrier for consumers (e.g., by providing device subsidy)	↓ **10-15%** of device subsidy by going to cheaper thin-client devices

Note:1) Assume COGS at 50% of Opex, SG&A at 30%, D&A at 20%. 2) 3G/4G costs exclude spectrum costs.
Source: Cisco IBSG SP analysis

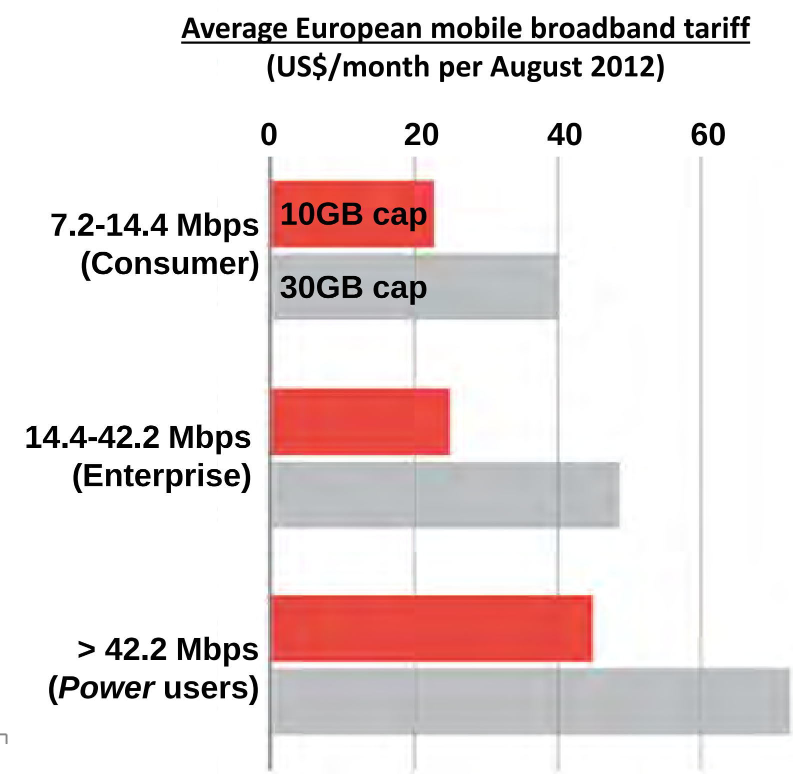
SPs Moving Away from Flat-rate to Capped, Tiered or Value-based Pricing

Flat-rate pricing led to stagnant service provider profitability despite increased traffic



Source: Cisco IBSG Analysis of Reuters Financials. Data is from Top 20 Global Mobile Operator based on Revenue, and Ericsson Global total traffic in mobile networks 2007-11

Now, they are moving to capped, tiered or value-based pricing

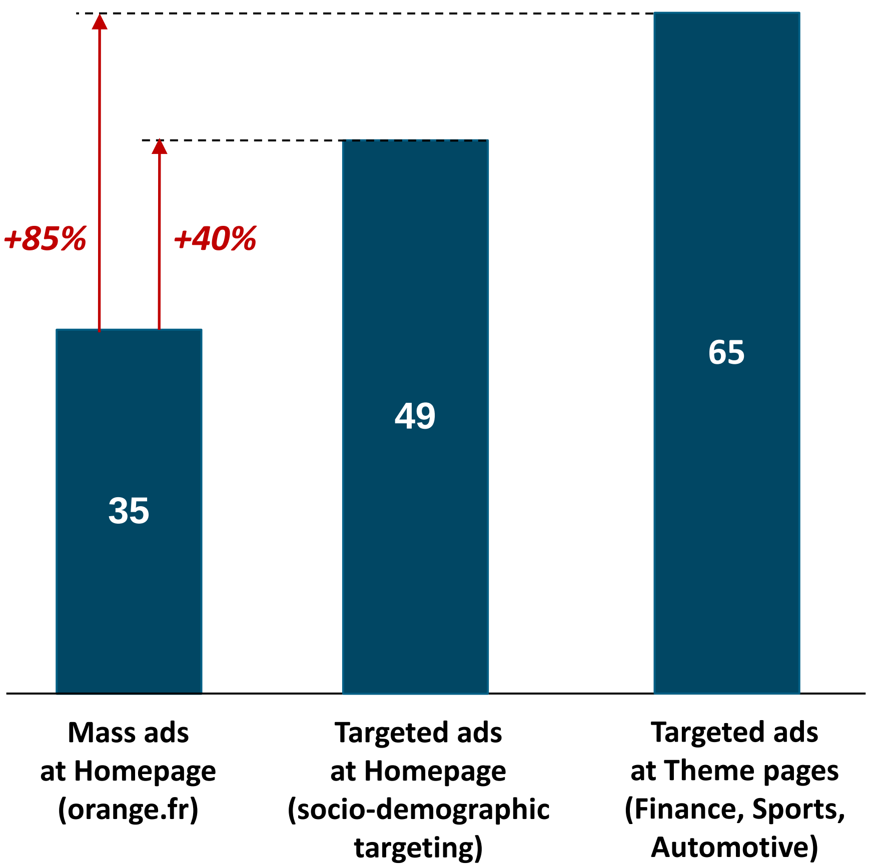


elisa

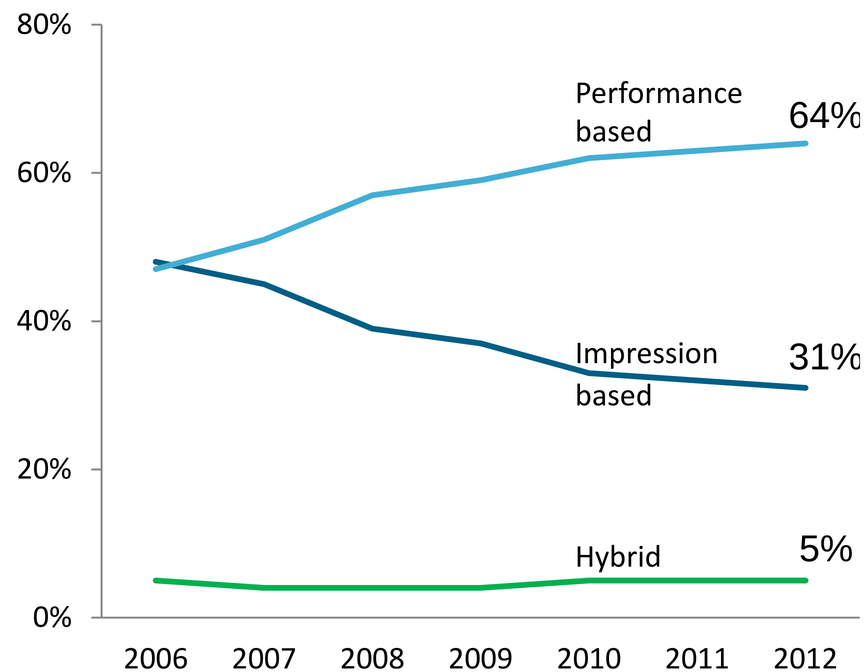
€3/month for 20Mbps speed boost (1→21Mbps); 30% increase over their standard mobile broadband offering

Advertising Business Moving to Performance-Based, Targeted Model

Orange's Video Ad CPM Rates
(Euro)



Internet Advertising Revenue Mix



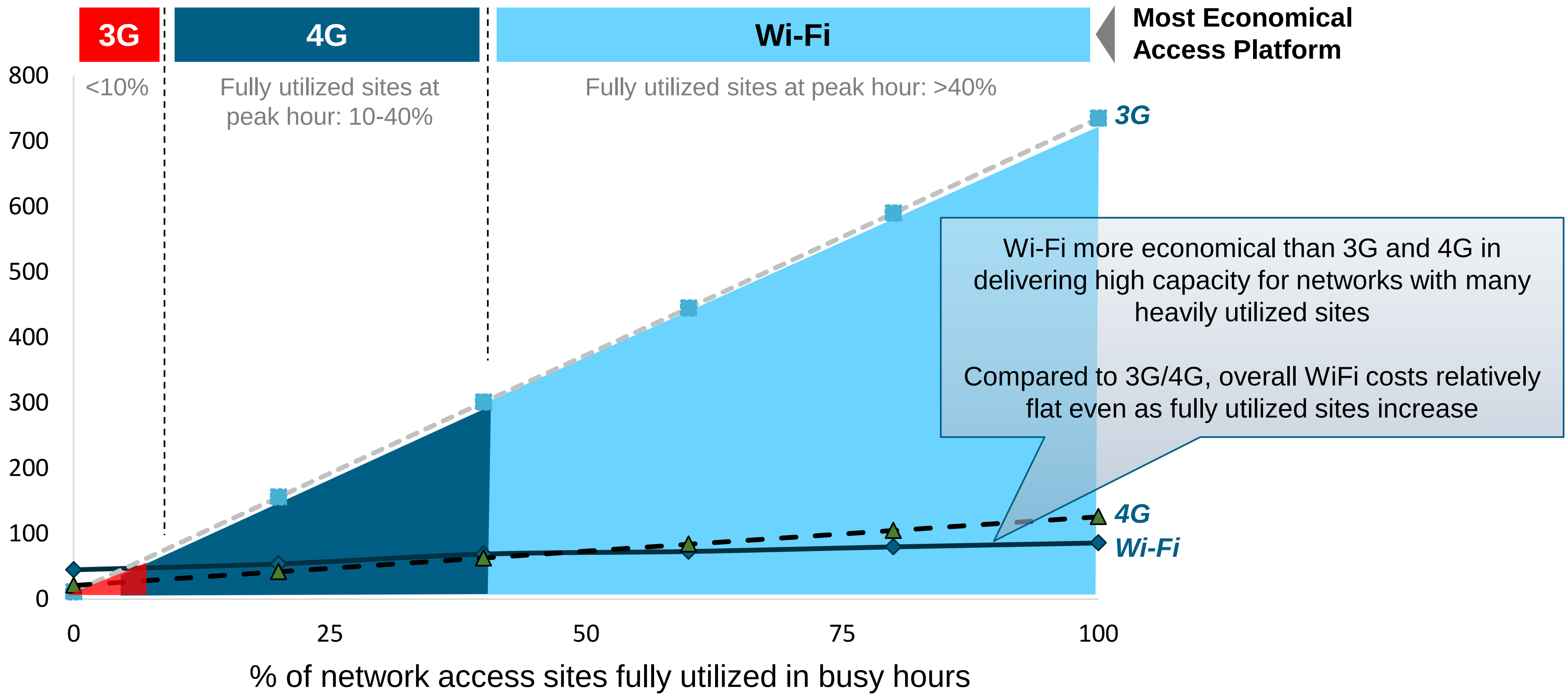
- Revenue share from **impression-based** (CPM) ad model **continues to decline**
- Maximizing benefits from performance-based model (CTR) requires **sophisticated targeting** provided by **analytics**

Source: Orange Ads Rate Card, 2011

Source: Cisco IBSG analysis

Consider Wi-Fi to Reduce Access Network Total Cost of Ownership (TCO)

Example: Variation of 5-year TCO of access platforms for major APAC service provider (excluding spectrum fees)
$ million



SOURCE: Cisco IBSG SP- Comparative Access Platform Economic Model

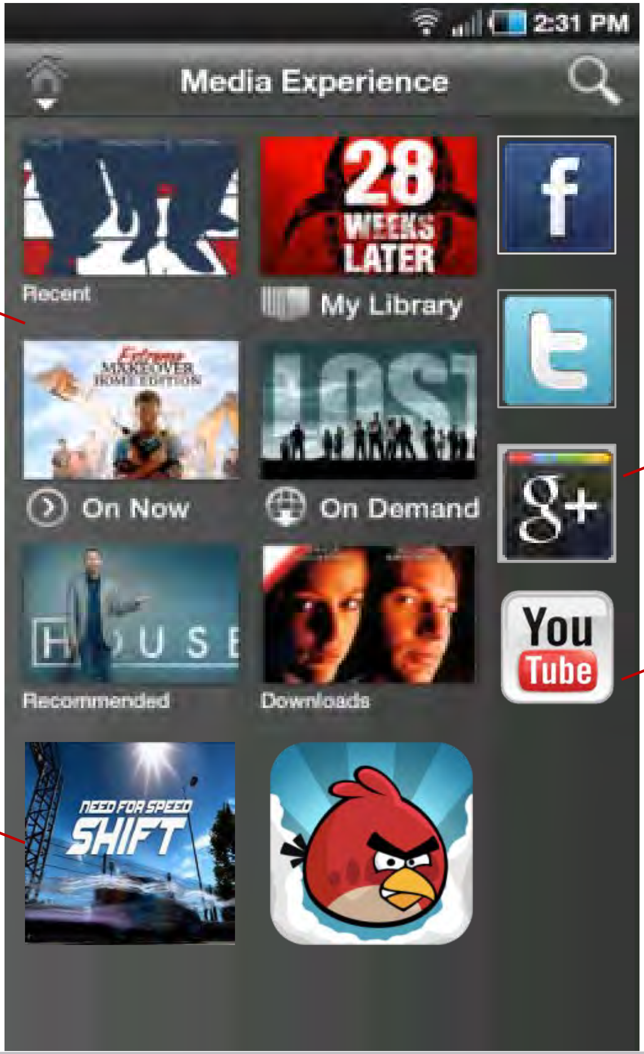
Not A Lone Journey: Ecosystem Approach is Needed

Collaborate with media companies and premium content providers

- Enable users to bring quality TV and cinematic content into the overall experience

Create app and content development community via Platform-as-a-Service

- Develop win-win scenario – obtain content at reason-able cost while sharing revenue with developers
- Allow users to customize experience through apps and preferences



Partner with Over-The-Top (OTT) application and content providers

- Make content discovery easy, by enabling search and relevant recommendations across all content partners
- Integrate Web 2.0 elements such as user-generated content to attract next-generation bankable population

Key Factors for SPs to Realize Mobile Cloud Success

Key Success Factors

Innovations	Contents & apps are foundation of services. Explore app stores, PaaS developer communities
Advertisement revenue	Advertisement as second source of revenue to subsidize deficiency from subscriber revenue
Personalized services	Users value targeted content and ads. Cloud brings personalization to users anywhere, anytime
Ecosystem of partners	Mobile providers cannot do this alone. Need content providers, advertisers, content developers to participate in value chain

Mobile Provider Actions

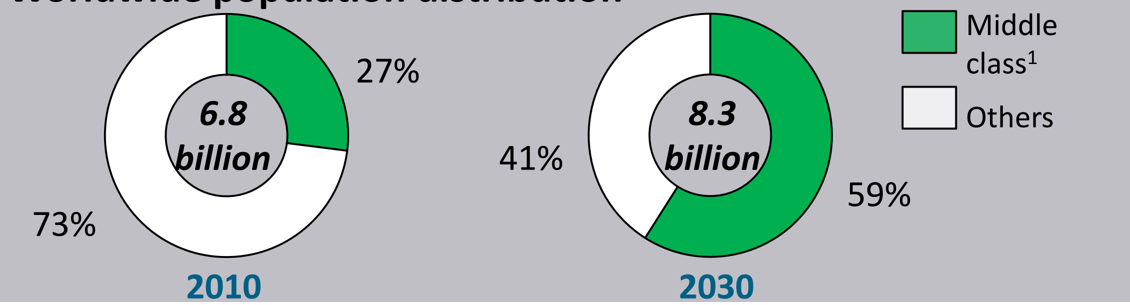
Telstra	Multi-screen concept combining traditional and Web 2.0 digital media content delivered to mobile, TV & PC
SingTel	SingTel bought Amobee mobile ad solution provider for $321M. Globally, ad is expected to comprise 24% of mobile cloud revenue in 2016
KDDI	Social media (e.g., Twitter) analysis – subscriber profiling for campaign assessment
中国移动通信 CHINA MOBILE	Mobile Market – World's largest mobile provider's app store with 160 million users, 630 million downloads, revenues US$8 billion

Source: Cisco IBSG Press search and analysis http://www.cisco.com/web/about/ac79/docs/sp/Mobile-Cloud.pdf

Globally, Consumer Spending Patterns Are Shifting Significantly

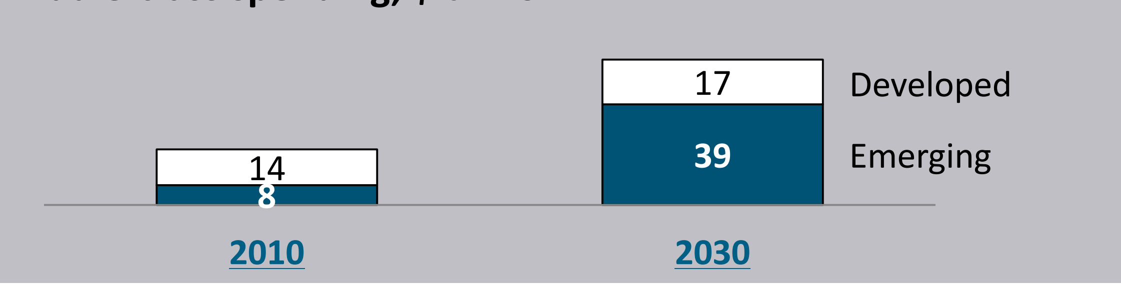
***Middle-class*[1]** **consumers are rapidly increasing and would outnumber other income segments**

Worldwide population distribution



Middle-class in Emerging Countries*[2] *such as China and India would outspend Developed Countries

Middle-class spending, $ trillion



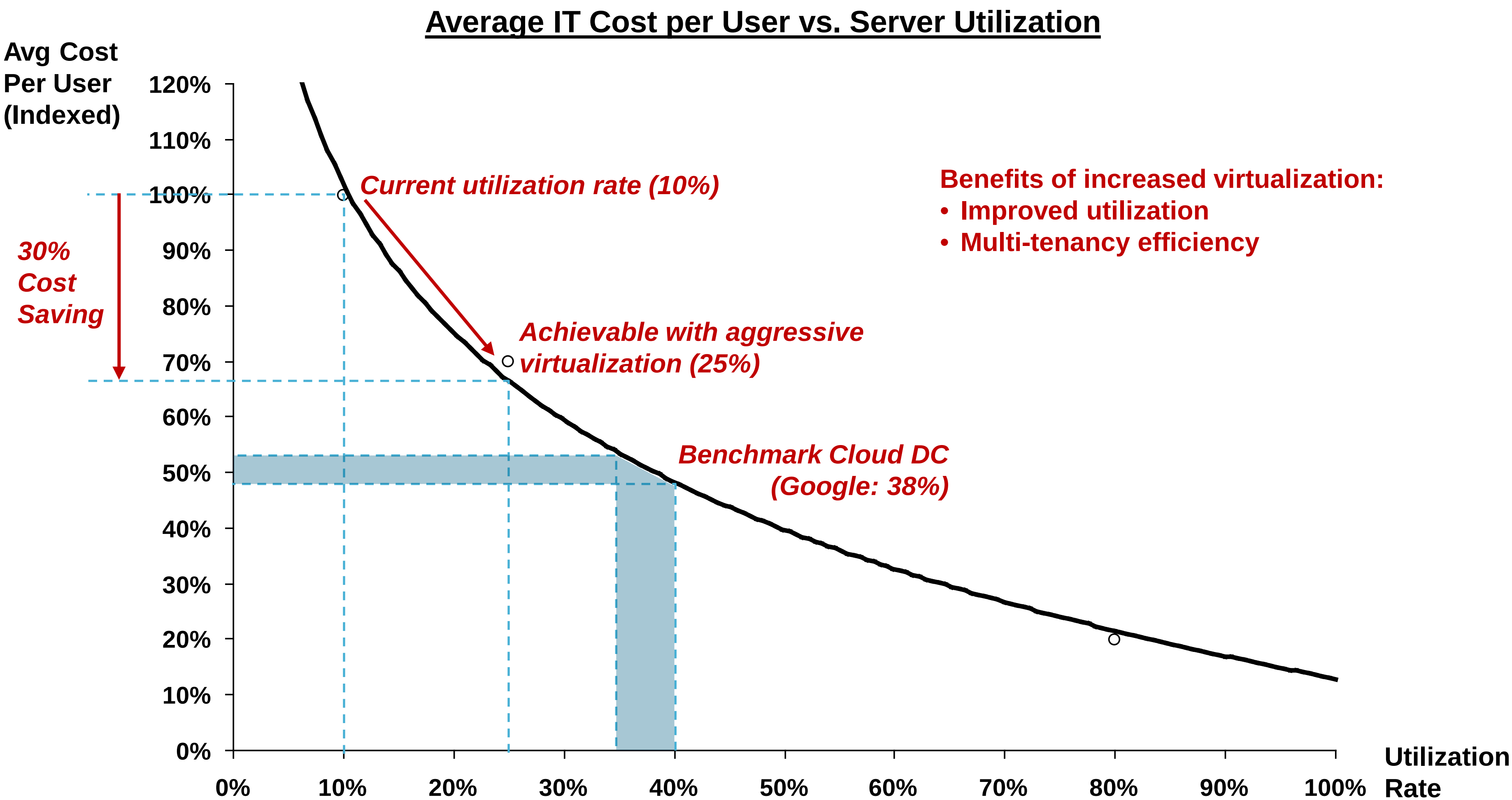
Developed Countries are *ageing*, while Emerging Countries would remain *young and tech-savvy*

Distribution of population in 2030, %

1. Expenditures between $10 to $100 per day, 2005 PPP
2. Developing APAC, Middle East and Africa, and LATAM , whereas Developed include Europe and North America

Source: Cisco IBSG SP, Kharas, "The Emerging Middle Class in Developing Countries," OECD; US Census Bureau,

Aggressive Virtualization Can Result in Significant Cost Savings



Note: Based on successful virtualization projects by VMWare
Source: VMWare, McKinsey, Cisco IBSG APAC