The Evolution of Mobile Technology

Part 5:

The impact of the cloud on mobile devices

November 3, 2009

Moderated by Jim McGregor
Chief Technology Strategist
In-Stat

Introduction

- **Welcome to the Evolution of Mobile Technology webinar series featuring:**
  - Designing of High-Performance and All-Day Battery life (replay available)
  - Design Challenges of Supporting Multiple Connectivity Technologies Architectures (replay available)
  - The Evolution of Mobile Processing Architectures (replay available)
  - Breaking Down Challenges in Open Source – Tricks of the Trade (replay available)
  - ***The Impact of the Cloud on Mobile Devices (Nov. 3)***
  - The Future of Wireless Technologies (Dec. 8)
- **Today's host:**
  - Jim McGregor, Chief Technology Strategist, In-Stat
- **Agenda:**
  - 5-minute overview
  - 30-minute discussion by panelists
  - 25-minute live Q&A
- **Webinar archive available at:**
  - www.ti.com/wirelesspresenations
  - www.instat.com

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Panelists

- **Ramesh Iyer, TI**
  - Head of worldwide business development for mobile computing
  - Member, Group Technical Staff (MGTS)
    - Manages worldwide business development and operations
    - Helps defines and shape product strategy, identify strategic partnerships, and support critical market communications and customer relationships
- **Terry Myers, DELL**
  - Senior Product Planner – Dell Business Client
    - Product Planning Manager, Security and Software Products
    - Former Dell Enterprise Solutions Marketing, Group Manager
  - 26+ Years of Tech Experience at Dell, Compaq, and startups
    - Enterprise Solutions Marketing, Group Manager at Compaq
    - Serial Entrepreneur, Small businesses owner

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Overview

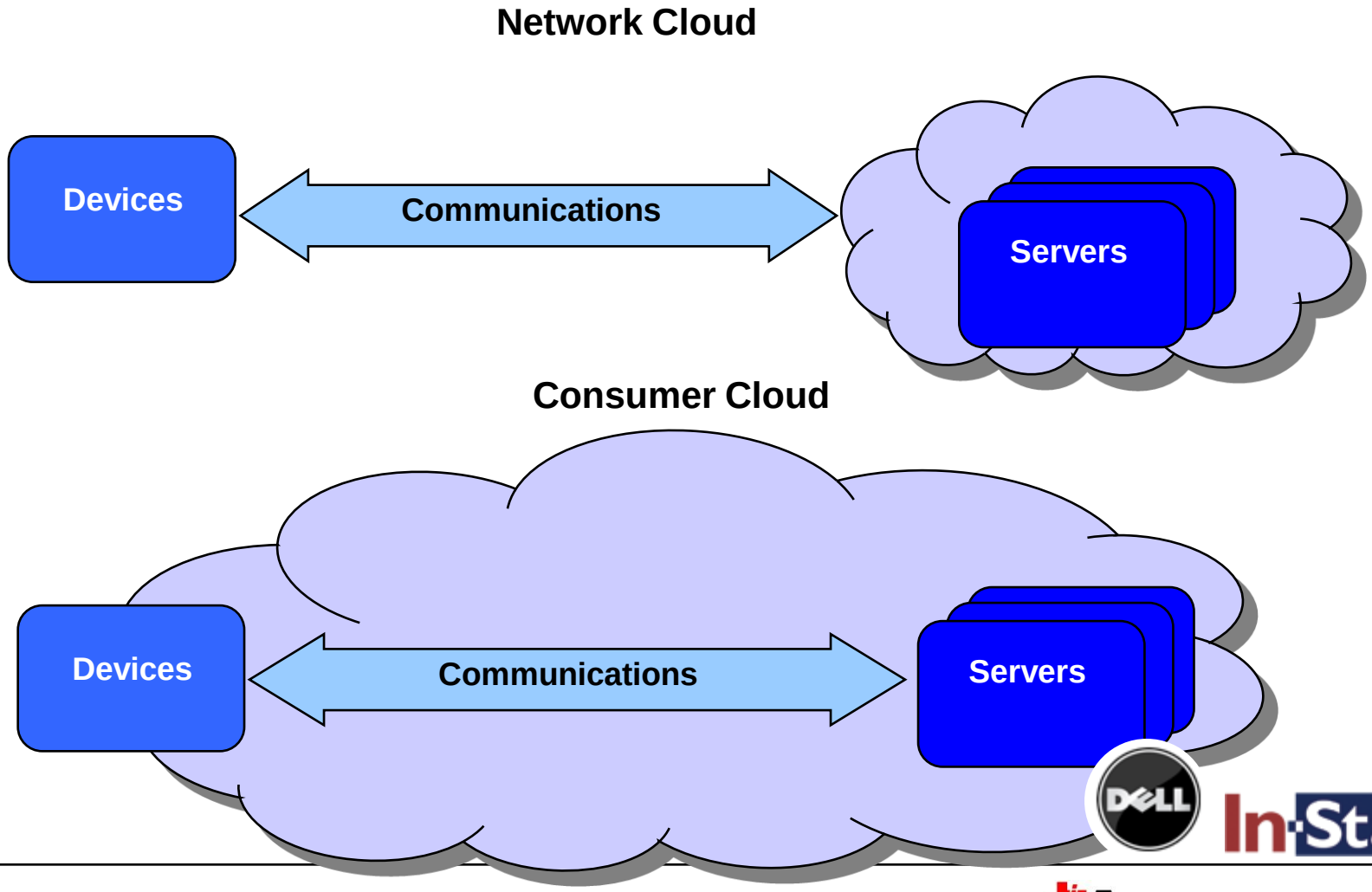
- **The new world** (Jim)
  - What is cloud computing?
  - Why is the cloud important?
  - How the cloud will effect mobile devices?

- **New mobile dynamic: Pie in the sky…in your pocket** (Ramesh)
  - Vital components in the cloud computing mix

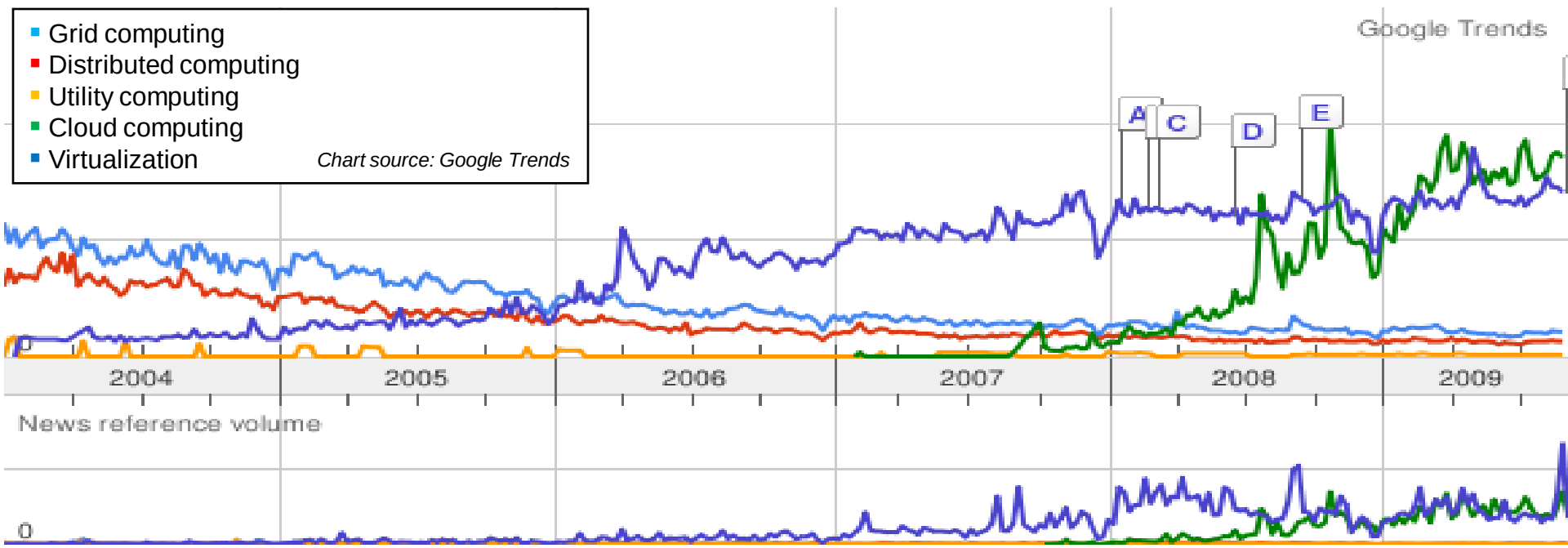
- **Is the world fat or thin? Yes it is…** (Terry)
  - New options for hybrid access to the cloud

What is cloud computing?

The Cloud Evolution



What is cloud computing?



- **Grid computing:** Using resources of many computers in the network to solve a single problem
- **Utility computing**: Pay-as-you-go access to compute resources
- **Cloud computing:**
  - Denotes the cloud as the internet or a large networked environment
  - Relies on services running on compute machines inside the cloud

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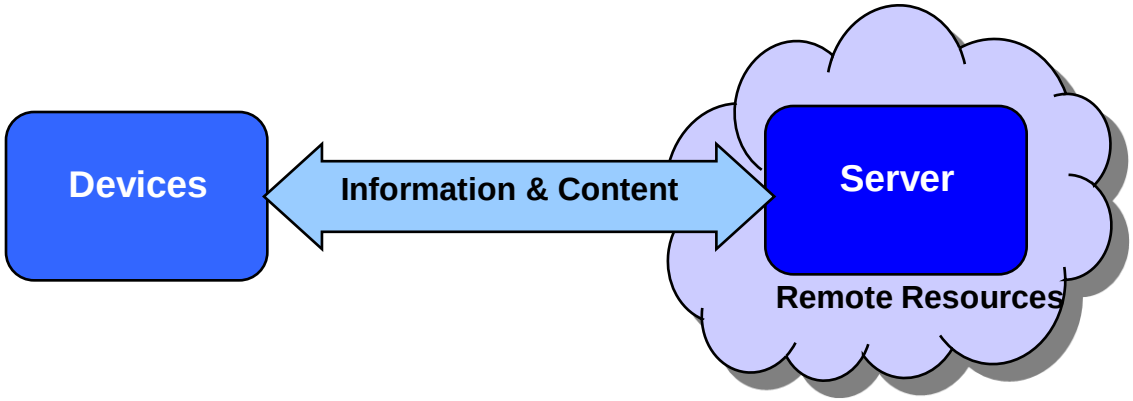
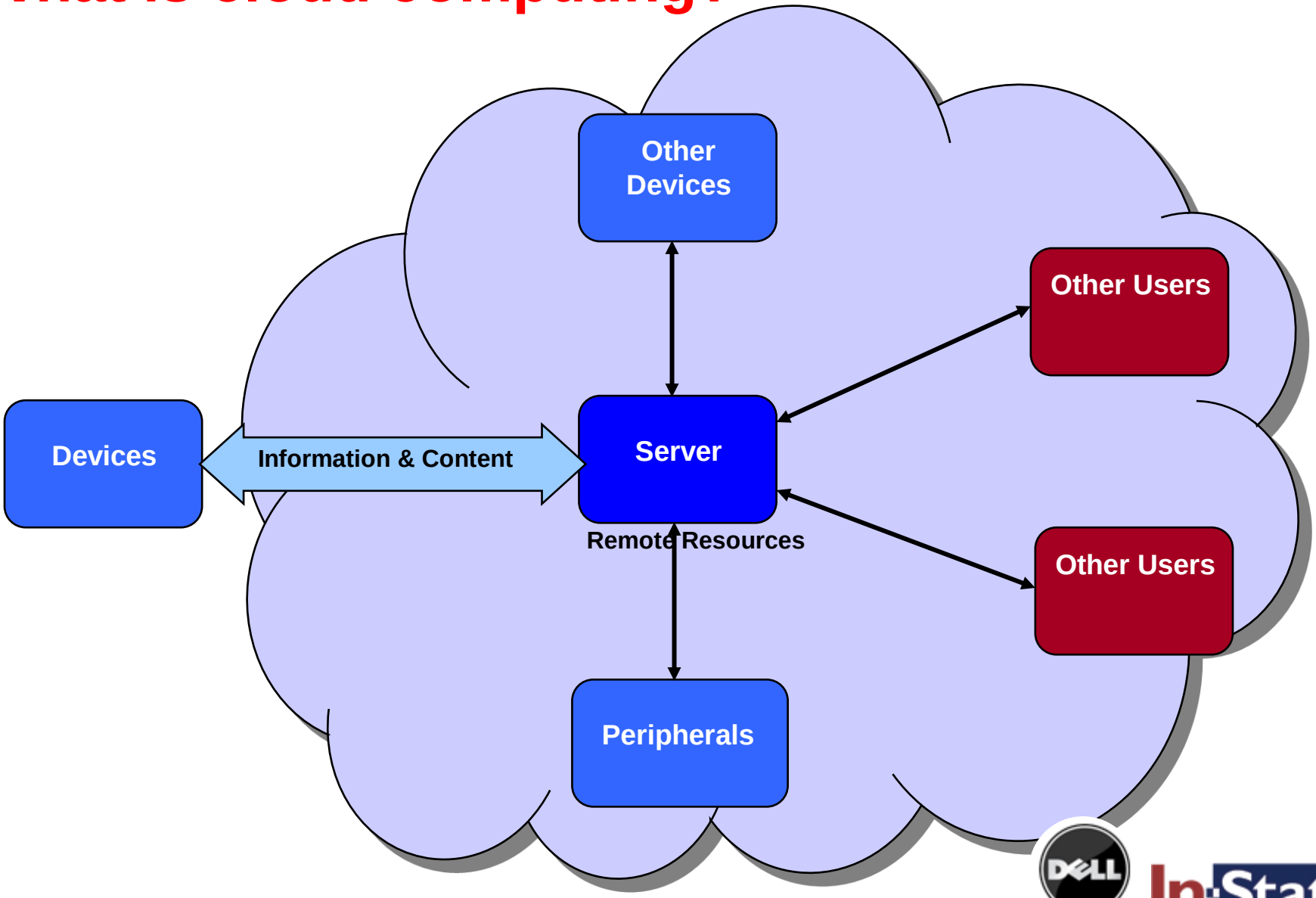
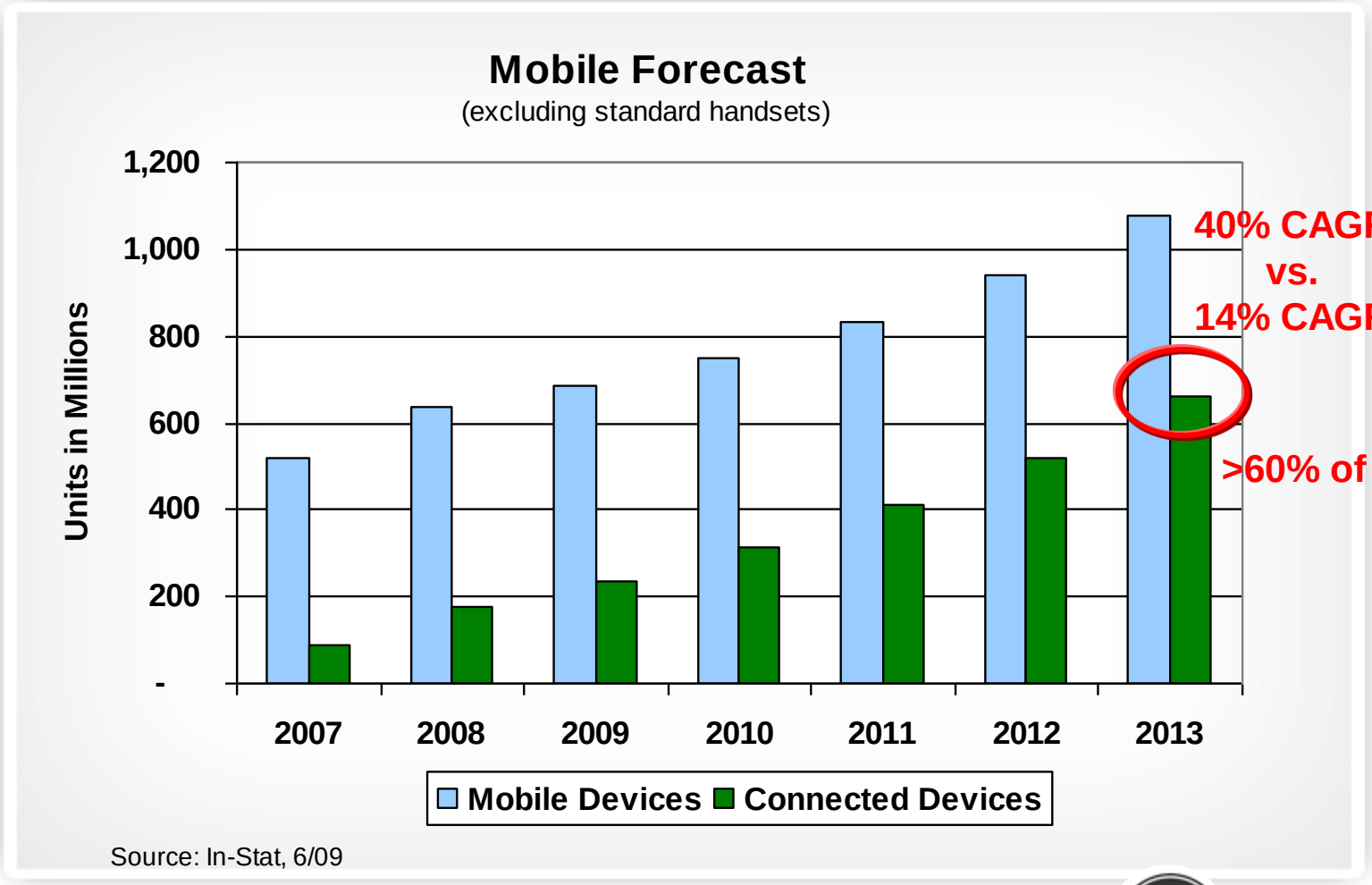
What is cloud computing?



What is cloud computing?



Why is the cloud important?



Source: In-Stat, 6/09

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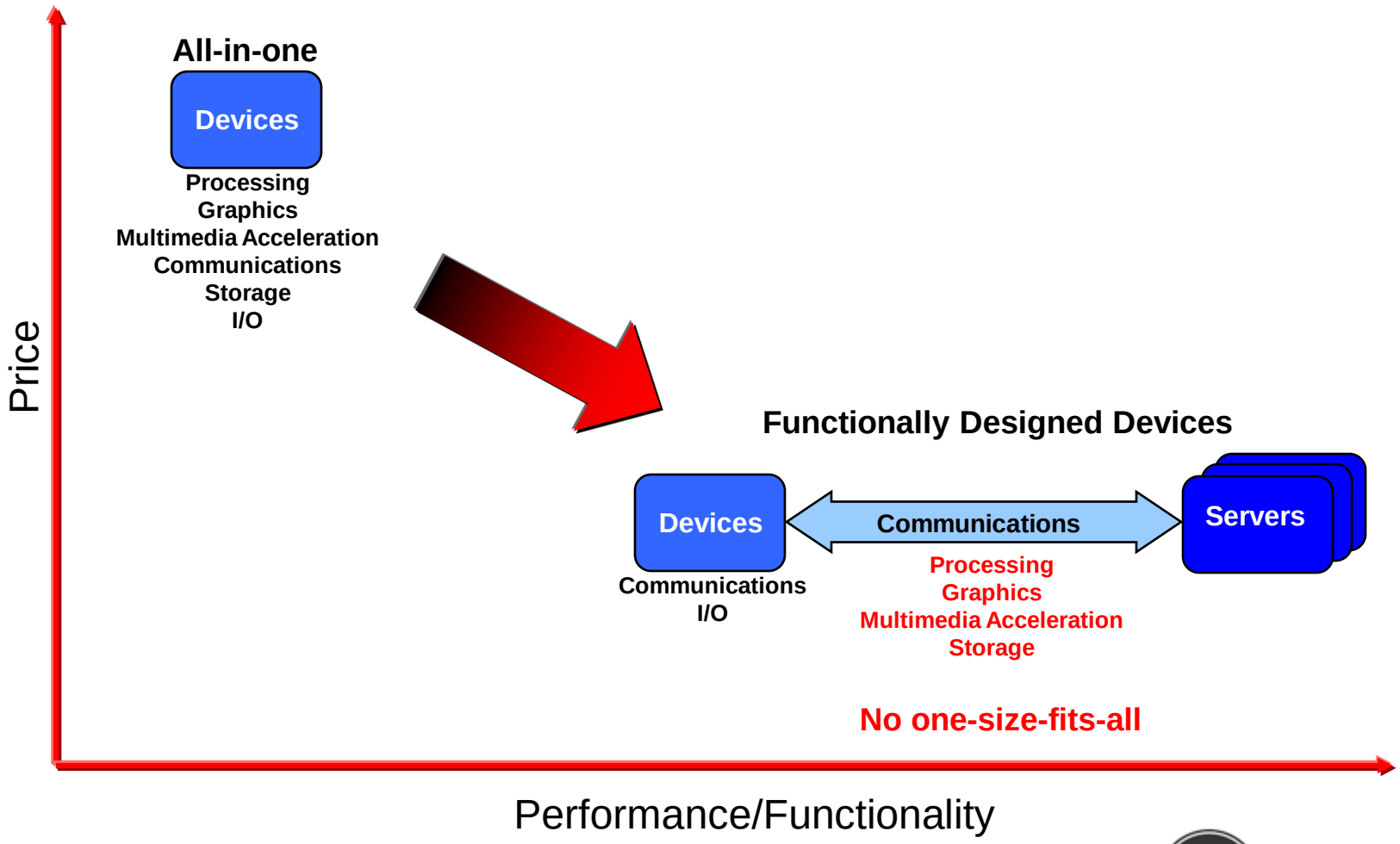
How will the cloud effect mobile devices?



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New mobile dynamics: Pie in the sky…now in your pocket

Ramesh Iyer

TI

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Key points and thought starters

Will all computing move to the cloud?

- Is the cloud secure?
- Is the bottleneck in the physical layer? 3G or 802.11n?
- Will smartphones become thin-client machines?

Any device connected to any content anywhere

Ubiquitous computing

- Cloud is agnostic

Next generation UI – new human-machine interaction mechanics

OMAP processor performance ↑

OMAP processor power consumption ↓

Hardware system cost ↓

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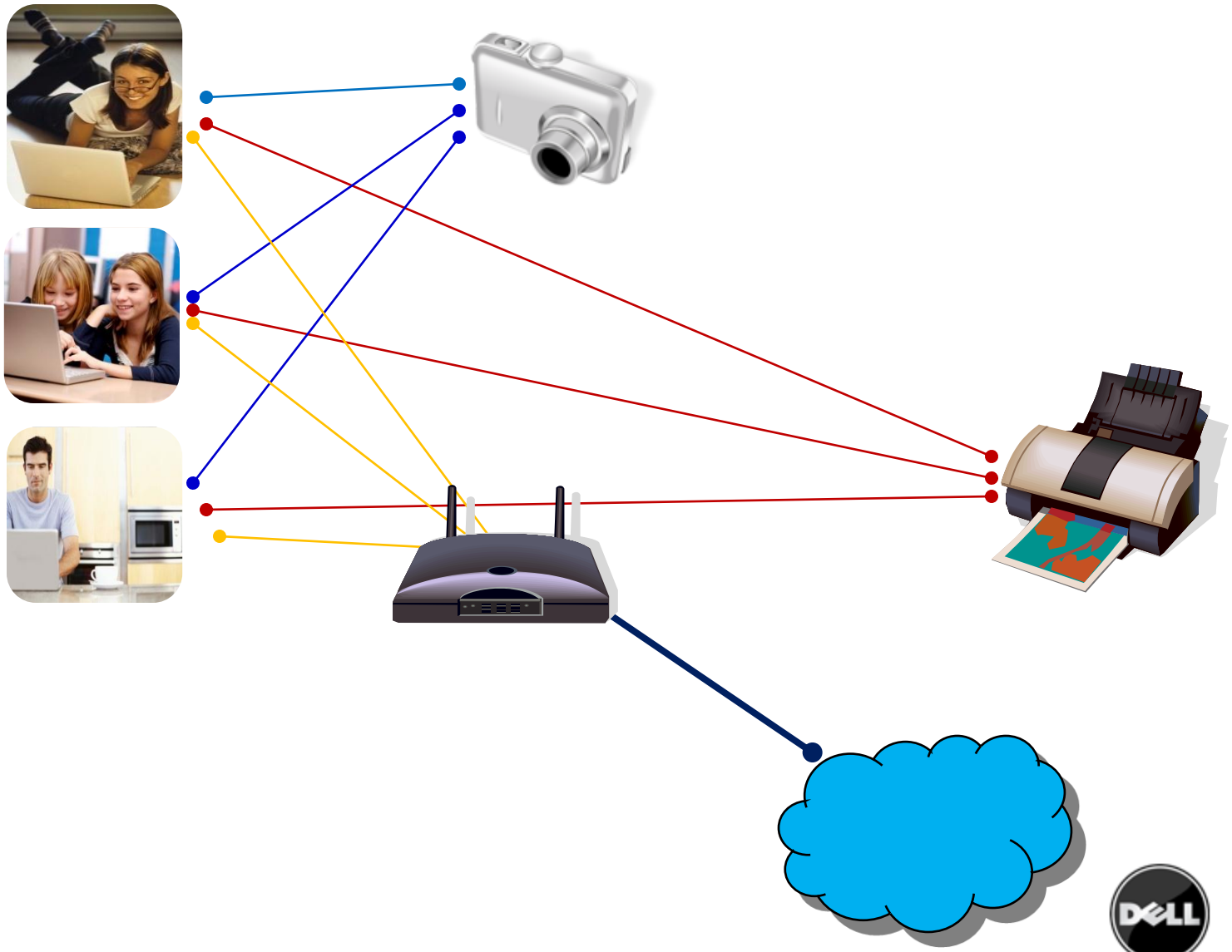
New dynamic in “connecting to the web”



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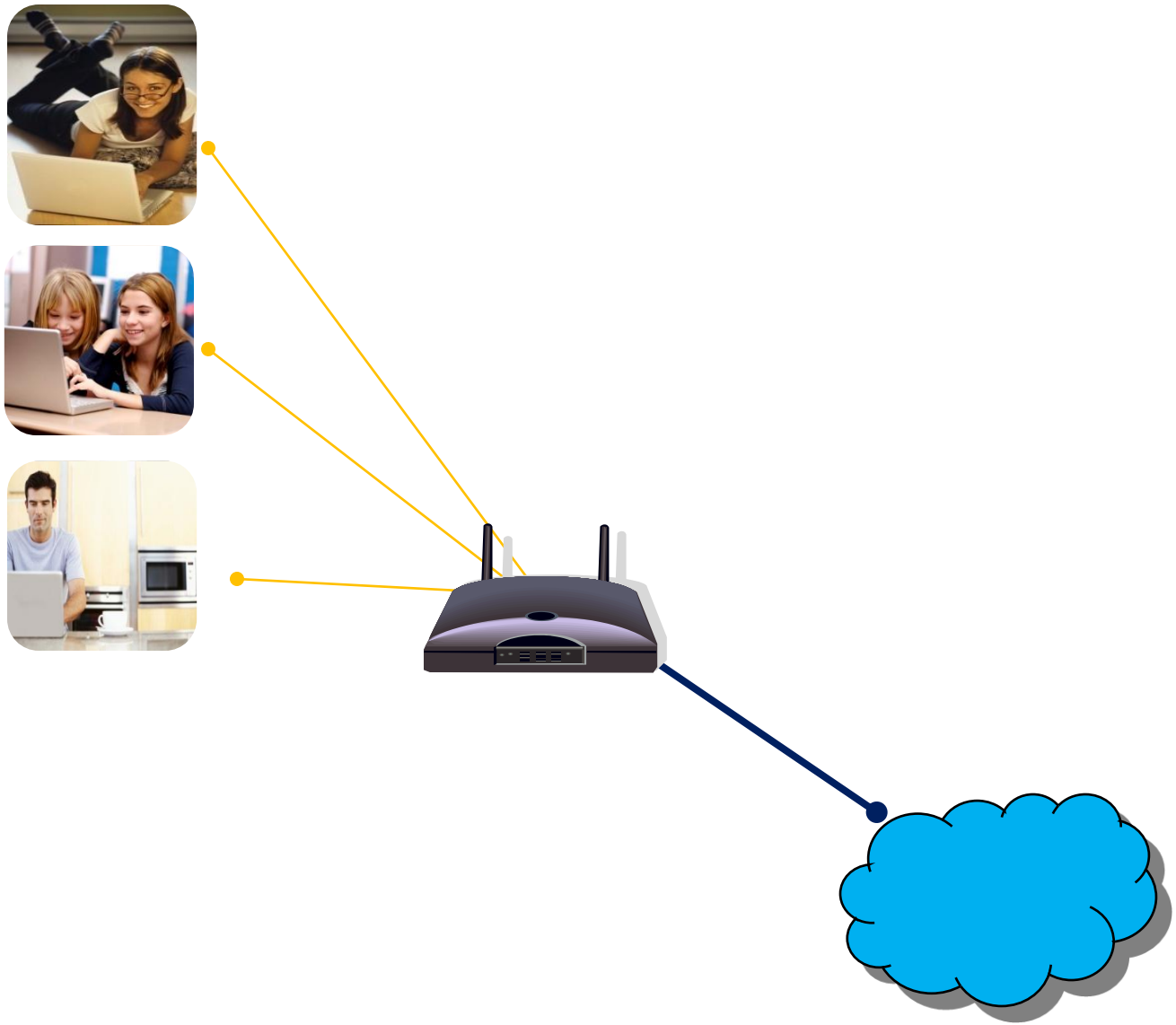

New dynamic in “connecting to the web”

HOSTED SERVICES

HOSTED SERVICES

HOSTED SERVICES

- Always connected
- Always on
- All-day performance
- Instant-on
- Delivery of app services through web UI
- Web transformation from content consumption to content collaboration

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Enterprise cloud computing

UI + APPS

OMAP FOUNDATION SOFTWARE

ENTERPRISE CLOUD

- DSP accelerated multimedia
- 1080p video playback and record
- 720p @30fps video conferencing
- Battery optimized all-day video
- Unified communications quad play: voice, video, data, mobility
- Integrated voice, video, IM, web-conferencing, voicemail, presence

- Full, no-compromise Internet browsing
- Support for all plug-ins
- Flash-10
- All day browsing

- Seamless connectivity
- Instant-On (<5s boot-up)
- 10-12 hours of battery
- Voice /video over WLAN

WiLink™ 6.0 WLAN + Bluetooth®+ FM (RX & TX) Solution

NaviLink™ 6.0 A-GPS + Bluetooth®+ FM (RX & TX) Solution

BlueLink™ 7.0 Bluetooth® + FM (RX & TX) Solution

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OMAP™ 4 Processor

OMAP™ 3 Processor

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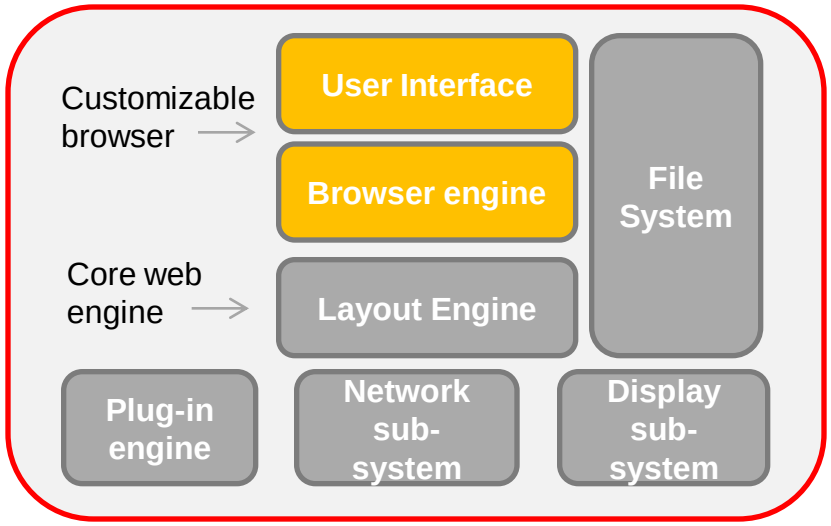
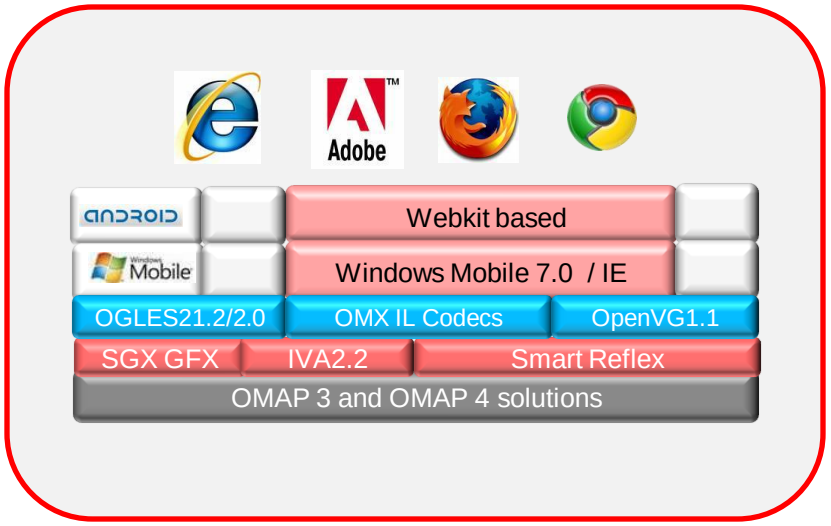
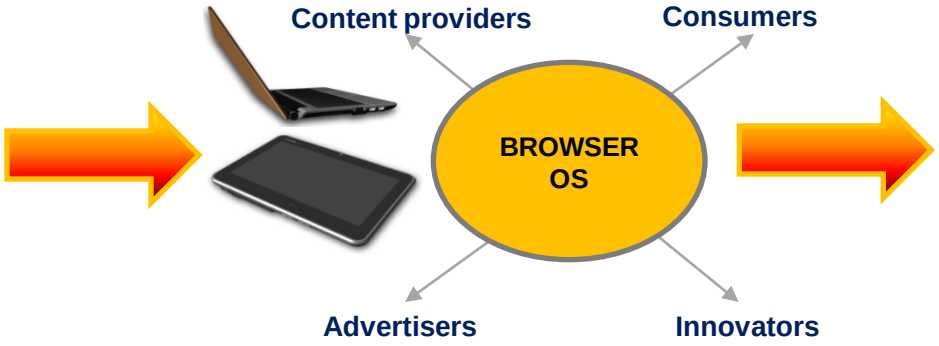
Cloud OS and cloud UI





Network = computer → Browser = OS



PRE-2009 → 2009 – 2010 → 2011 +

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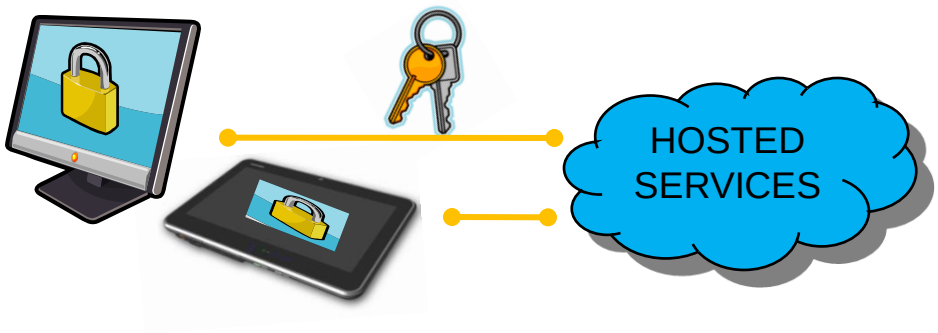
Security: A “must have”



- Identity
- Applications
- Data

- Secure cloud hosting environment
- End-to-end security

Security-demanding applications

- Applications
- OS

Secure services SMC

- SW Trusted Execution Environment:
  - Concentrates Security-Sensitive Functions
  - Low-level hardware security features
  - Provides uniform interoperable standard-based APIs

Low-level security features

- Crypto-accelerators
- Secure execution modes
- On-chip keys
- Secure RTC
- Monotonic counter
- Secure DMA

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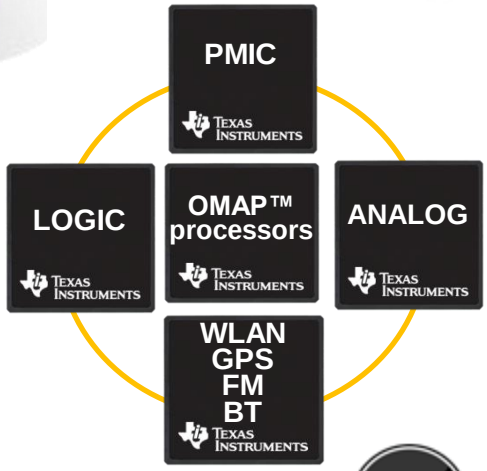
Vital component: Mobile power

PROBLEM : Managing power consumption intelligently even if the device is always plugged

SOLUTION: Manage (in silicon and software)

1. Active “SYSTEM” power consumption
2. Idle “SYSTEM” power consumption



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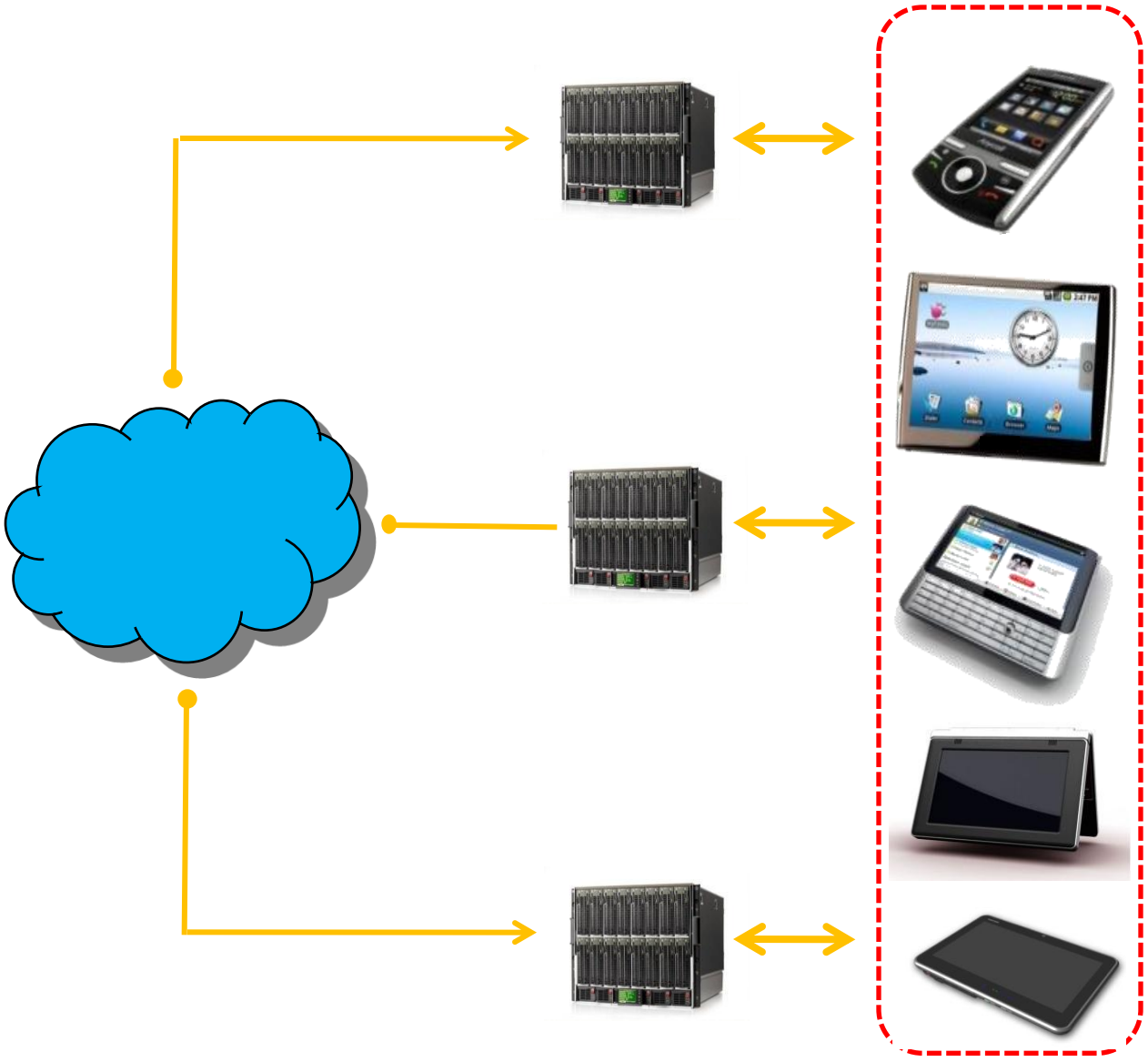
Key attributes of a thin-client



OMAP™ Processors
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WLAN , GPS, Bluetooth®, FM (RX & TX) Connectivity
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Battery management
- All day battery usage
- Integrated power mgmt in OMAP processors / TI connectivity

Seamless connectivity
- Air-interface agnostic

User experience
- Applications performance
- UI performance
- Customizable skin

No-compromise browsing
- All-day experience

Multimedia
- Content consumption and collaboration
- Video conferencing

Productivity
- Email, Office, etc
- Seamless, all-day access

Is the World Fat or Thin? Yes it is….

Terry Myers
DELL

Mobility usage models

Highly mobile users

- Still need thick mobile clients
- Can't afford to lose access
- Typically carrying multiple devices

– but –

Notebooks spend large periods of time turned off & unconnected due to:

- Limited battery life
- Limited connectivity
- Limited portability

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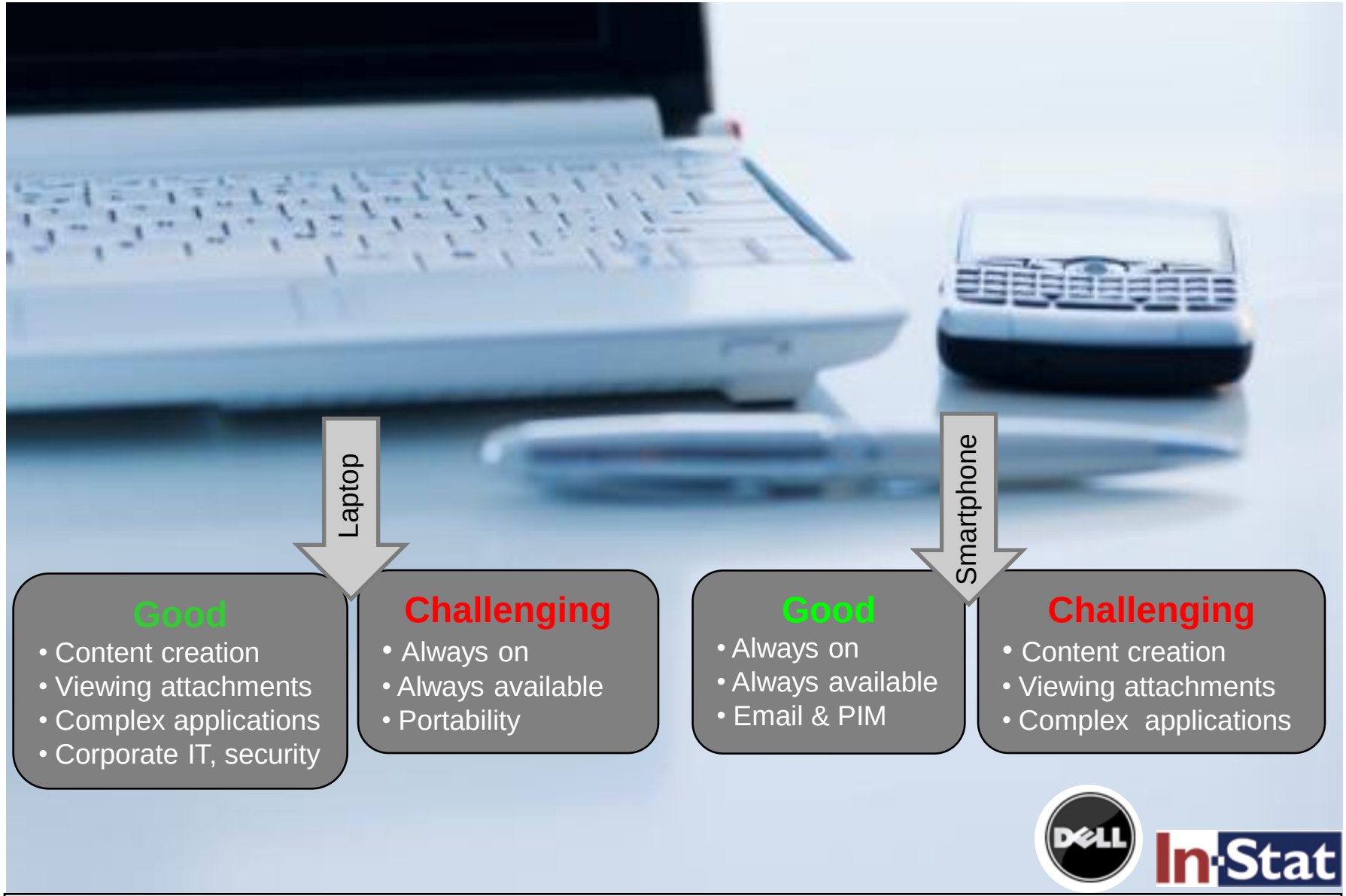
Mobility evolution?

Usage model	Definition
Self sufficiency	▪ Notebook performs all business tasks ▪ Minimize the peripherals I have to carry ▪ Make the notebook secure to use in any environment
On-the-go collaboration	▪ Allow constant connectivity regardless of location ▪ Enable interoperability with all my mobile devices ▪ Location of my colleagues and key services
Instant access	▪ Allow instant access to critical applications ▪ Enable persistent wireless connectivity - work anywhere ▪ Allow web access even if my notebook crashes
Anytime-anywhere managed	▪ Enable 24/7 remote management, even if notebook is off ▪ Notebook tracking to restrict usage ▪ Remote data protection & wipe
At & around my mobile desk	▪ Wherever I work optimize my notebook for that location ▪ Enable automatically set-up & battery charging

The road warrior's dilemma



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User focus

Highly mobile users:

- Road warriors, Field sales
- Short 5-20 minute window to consume data, review, update & respond

Usage Model:

- Instant access to critical applications: e-mail, calendar, contacts & internet
- Multi-day battery life
- Always On / Always Connected - Real time bi-directional updates
- Alert, review, respond – utilizing full keyboard & display

Convergence

1. Smart phone-like instant, always connected, always pulling down data access.
2. Multi-day idle battery life with a smart integrated sub- processor.
3. A system within a system architecture on a corporate notebook.
4. Separate OS for fast boot and alternative use of laptop.
5. Thick & thin client usage, hybrid notebook computing, with Citrix Receiver.
6. Mozilla Firefox, a desktop app, and Linux Evolution e-mail running on a smart phone processor.

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One example: Latitude-ON™

Laptop productivity, smart-phone functionality

- Smart-phone-like experience with enhanced comfort and productivity of a laptop.
- No more tiny screens or text-like responses on tiny keypads.
- Instantly view complete attachments on a full screen and type complete e-mails on a full-sized keyboard.

Instant-access convenience

- Instant, send & receive, access to email, calendar, contacts and Internet.
- No system OS boot-up delays.
- Eliminates need to carry multiple devices.

Multi-day idle battery life

- Just as a smart phone has instant, always on functionality, holding a battery charge for days while idle - the same now goes for your laptop!

Secure remote access

- Hybrid laptop usage as traditional (“thick”) client and /or thin client – as a “system within a system”.
- Utilizing Citrix Receiver in thin-client mode, the laptop provides secure access to applications hosted on a server.

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Summary

- Cloud computing is creating a new environment that connects devices, resources, and users
- The cloud is accelerating the connectivity of all mobile devices with growth 3x the growth of the overall market
- Vital components – including power, security, operating systems and semiconductor capabilities – are working together to bring cloud computing to its full potential
- Cloud computing is changing the software stack with the browser playing a critical role
- Cloud computing is leading to innovation and functionally designed products – like DELL's Latitude-ON, combining TI's OMAP 3 processor with Linux and an x86 processor with Windows

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Q & A

- To participate, click on the Ask a Question link on the left side of the interface; enter your question in the box on the screen; hit “Submit.” We’ll answer them during the Q&A session or after the webcast.

www.ti.com/wirelesspresentations

community.ti.com/blogs/mobilemomentum

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