Connected Living
The next wave of mobile devices

Ton Brand, Programme Director

Connected Living Programme

Monday 27th February 2012

Our agenda

Overview of GSMA programme
Ton Brand,

16.15 **How can regulatory policy accelerate or impede market growth?**
Jeanine Vos, mHealth Executive Director, Connected Living Programme

16.30 **Ericsson Mobile Health Remote Patient Monitoring System**
Peter Håkansson, Manager Sustainability Research, Ericsson

16.40 **mHealth Demonstration – Vitality and Blue Libris Remote Monitoring**
Clay Owen, AT&T, Senior Director of Communications

16.50 **Ericsson cloud orchestration - ICT Solution for Connect to Learn**
Paul Landers, Programme Manager, Ericsson

17.00 **Planning For Data Growth: L-band Supplemental Downlink Spectrum Opportunity**
Wassim Chourbaji, Senior Director Government Affairs, Qualcomm

17.15 **Audience Q&A**
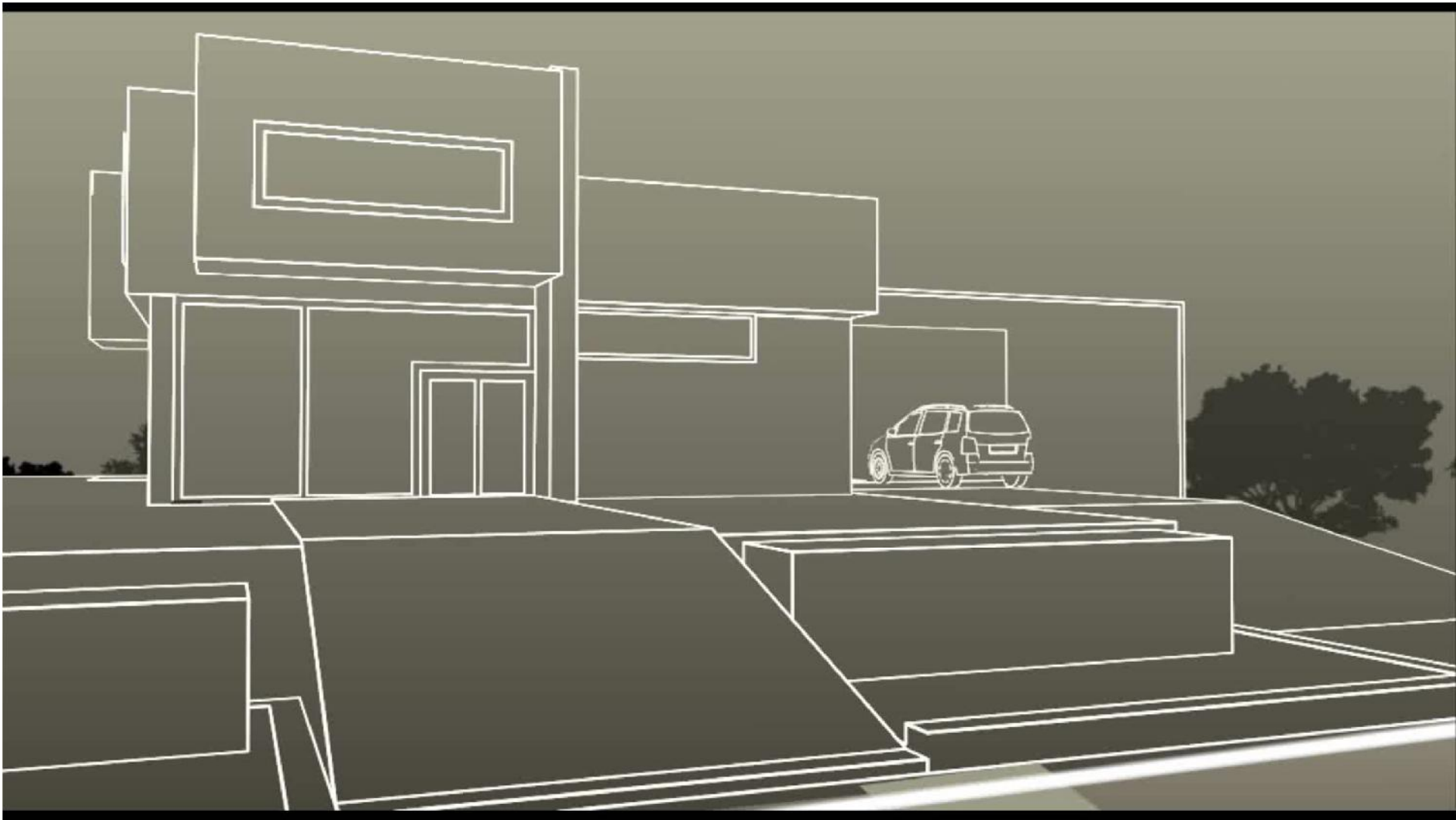
Connected Living Programme structure

mHealth	mAutomotive	mEducation

Service Awareness in Roaming

**Smart Cities Demonstrator
(Mobile World Capital)**

Connected Life Campaign

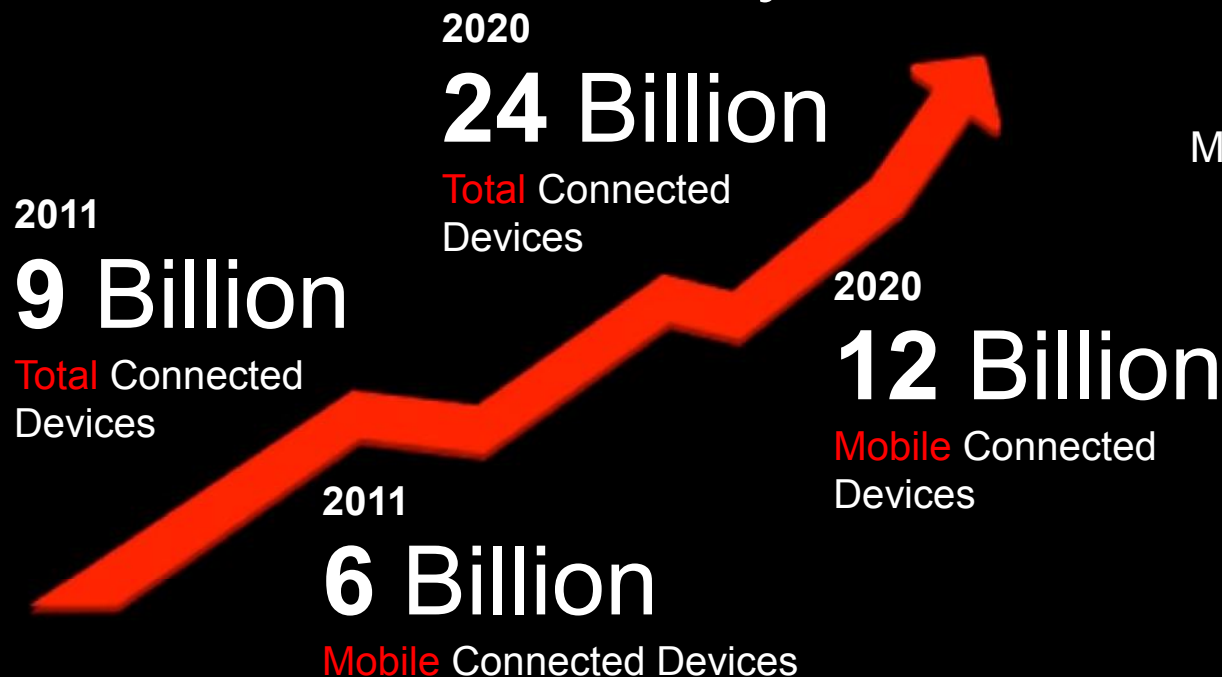# More examples…..

Connected House 2012

Ministerial Tour, Wednesday between 11.00 and 12.00

Global Revenues & Impact of the Connected Life

The Connected Life by 2020

2011
9 Billion
Total Connected Devices

2020
24 Billion
Total Connected Devices

2011
6 Billion
Mobile Connected Devices

2020
12 Billion
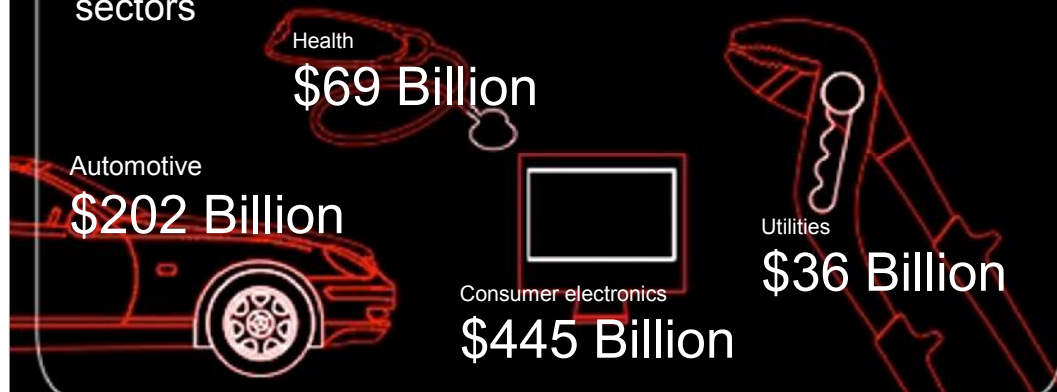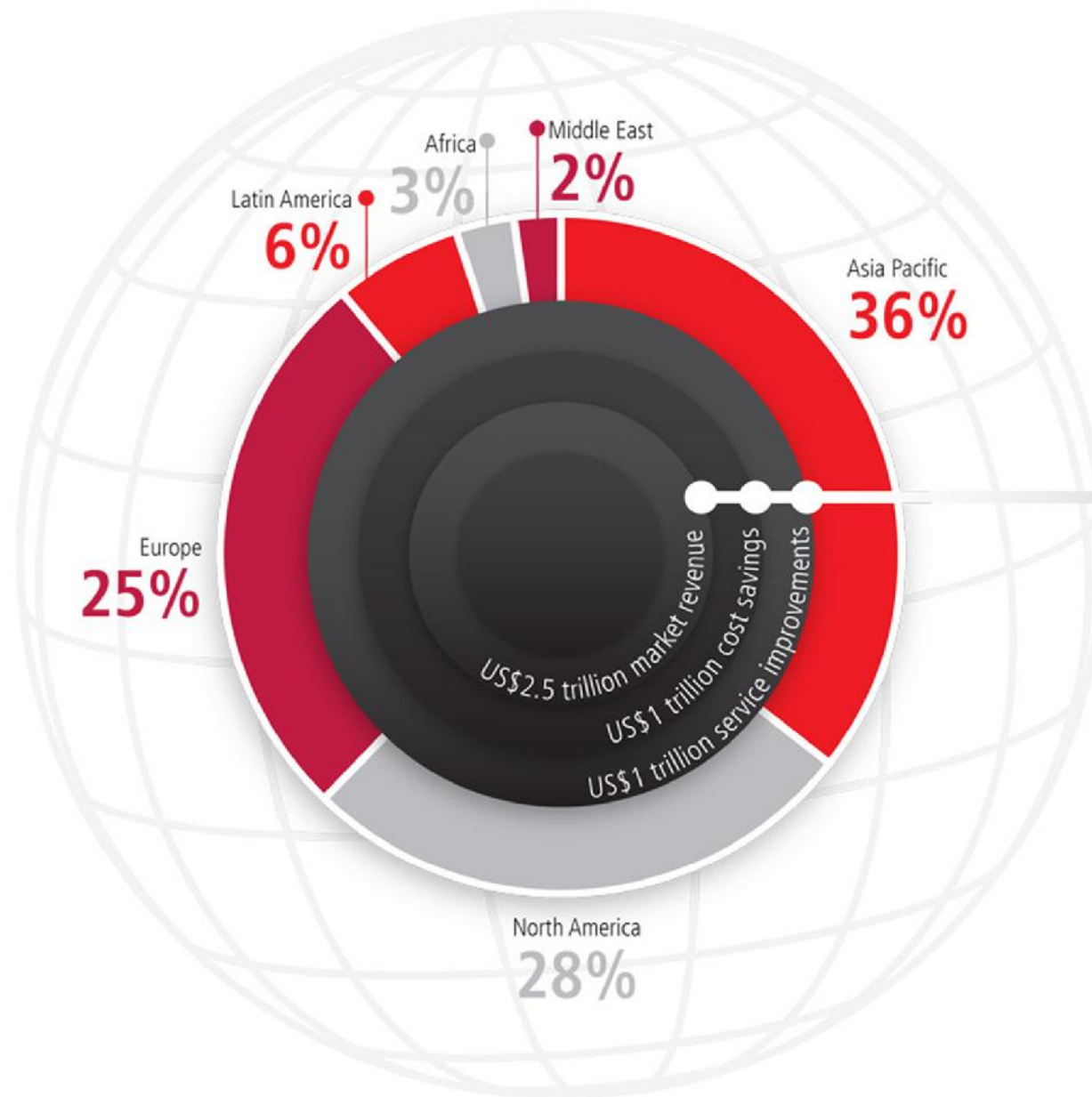**Mobile** Connected Devices

Revenue Opportunity For Mobile Network Operators in 2020

$1.2 Trillion

7x increase on 2011 expected revenues

Revenue opportunity for connected devices in vertical sectors

Health
$69 Billion

Automotive
$202 Billion

Consumer electronics
$445 Billion

Utilities
$36 Billion

Europe $305 Billion

North America $241 Billion

Middle East Africa $87 Billion

Asia Pacific $447 Billion

Latin America $92 Billion

CREATING OPPORTUNITIES THROUGH CROSS-INDUSTRY COLLABORATION

Africa **3%**

Middle East **2%**

Latin America **6%**

Asia Pacific **36%**

Europe **25%**

North America **28%**

US$2.5 trillion market revenue

US$1 trillion cost savings

US$1 trillion service improvements

Business Impact of the Connected Life 2020
US$4.5 trillion

Connected Life market revenue
US$2.5 trillion

○ **US$1.2 trillion** addressable by Mobile Network Operators

Cost savings resulting from Connected Life
US$1 trillion

Service improvements resulting from Connected Life
US$1 trillion

The Connected Life, with 24 billion connected devices projected by 2020, will create new revenue streams, business models and service improvements, and through industry collaboration can make a global business impact of US$4.5 trillion.

Research conducted by Machina Research

Programme Objectives

Accelerate the development of Connected Living services in agreed adjacent vertical markets	Stimulate trials, launches and demonstrat-ions in Automotive Education and Health vertical markets	Stimulate operators to challenge the existing service awareness and roaming model to reflect vertical market requirements	Collect and publish market analysis and statistics on the global adoption of Connected Living	Stimulate cross industry collaboration

Regulation can add value….

Market Drivers

- Automotive
  - eCall Regulation (EU)
  - Stolen Vehicle Tracking
- Utilities
  - Smart Metering
  - Smart Grid developments
- Education
  - Governments are the biggest spenders on education worldwide
  - Developing regions will lead the growth

Market Barriers

- Net Neutrality
  - Some services might requires higher SLA than others
- National SIM Card registration
  - Global market roll-outs, embedded SIM
- Privacy and Security
  - Not all devices requires same levels as consumer devices
- Numbering and addressing
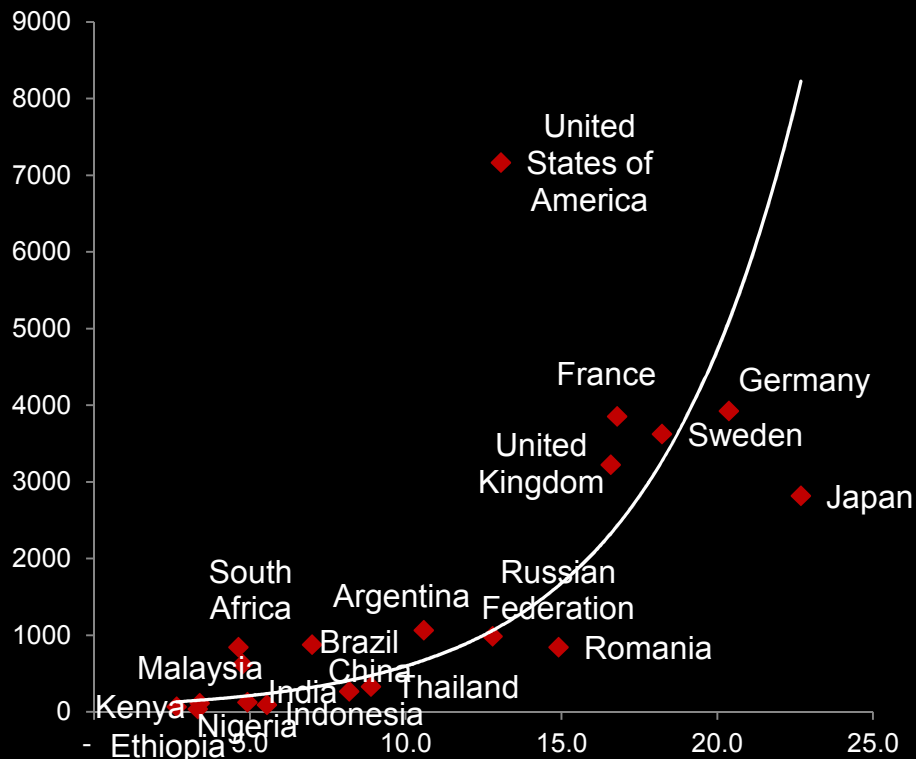 - Some devices do not require a MSISDN

Connected Living

Jeanine Vos

Executive Director, mHealth

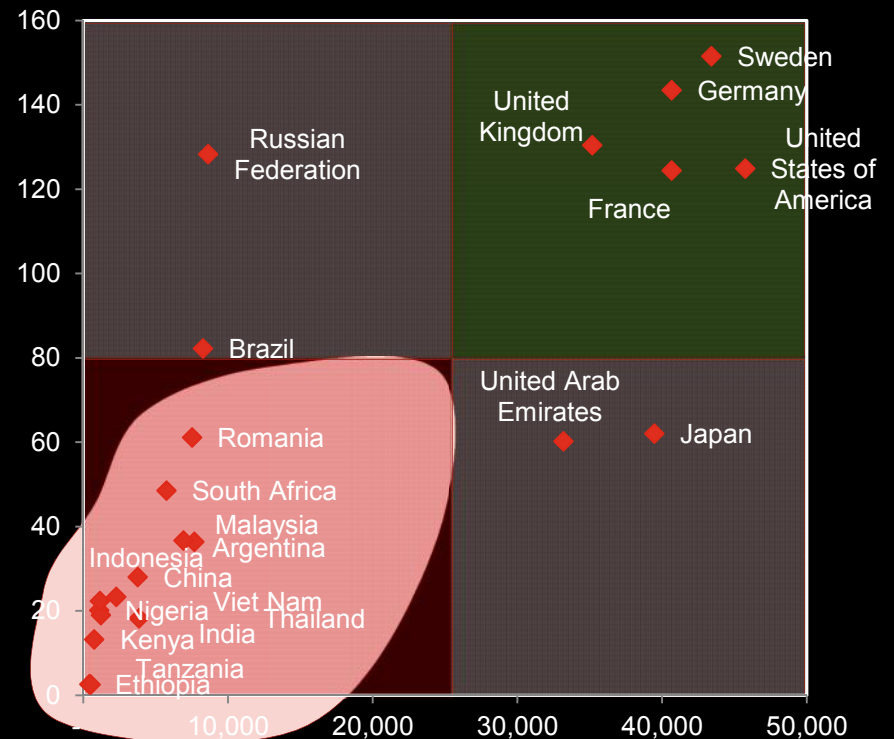Connected Living Programme

Monday 27th February 2012

Healthcare systems are under pressure

Per Capita Health Expenditure (PPP Int. USD) and % of Population Aged above 65, 2009/2010

Number of Physicians, Nurses per 10,000 population and GDP per Capita (USD) , 2010

Mobile provides ubiquitous technology platform

Comparison of Penetrations of Improved Sanitation Facilities and Mobile Phones in Selected African and APAC Countries, 2014E

Legend:
- ■ Access to Improved Sanitation Facilities - 2014E
- ■ Mobile Subscriber Penetration - 2014E

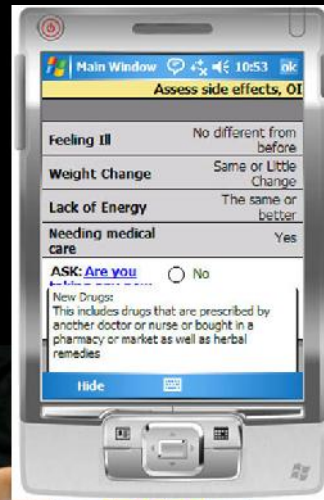# To reduce costs, increase access, improve care

Prevention **Diagnosis** **Treatment** **Monitoring**
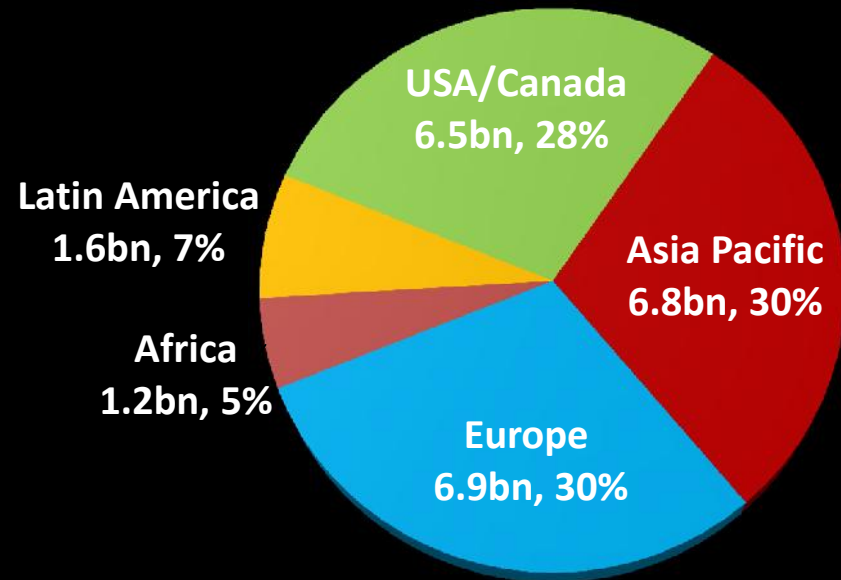
Significant growth in mobile health is foreseen

GSMA.

Global Mobile Health Revenue, 2013E-2017E, in USD billion

4.5
6.9
10.2
15.4
23.0
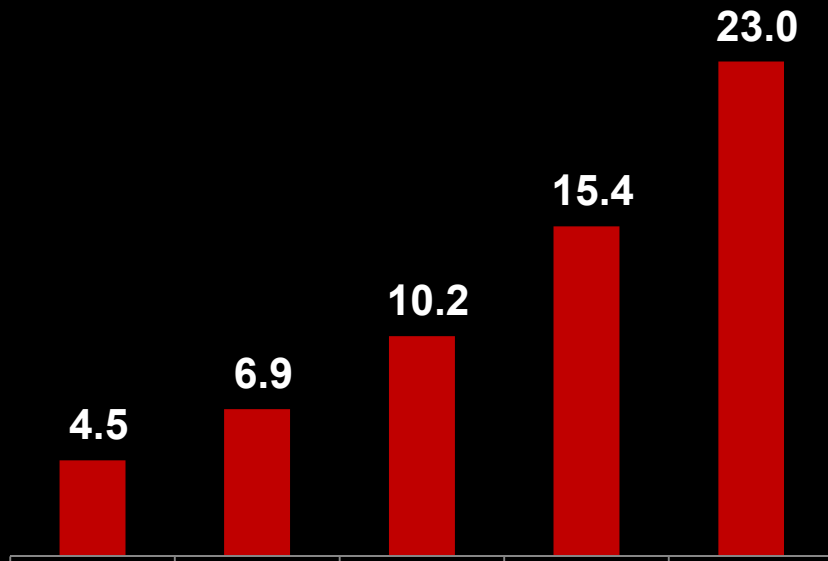
Source: PwC analysis

Mobile Health Revenue by Region, 2017E, in USD Billion and % Share

USA/Canada
6.5bn, 28%

Asia Pacific
6.8bn, 30%

Latin America
1.6bn, 7%

Africa
1.2bn, 5%

Europe
6.9bn, 30%

BUT CAN ONLY BE REALISED WITH GOVERNMENT AND REGULATOR SUPPORT

Different motivations in healthcare and telecoms

Patient Centric	Market Centric
Safety first	Maximize consumer value
Demonstrate efficacy	Foster competition
'At least, do no harm'	'Just enough'

Policy and regulatory touch points
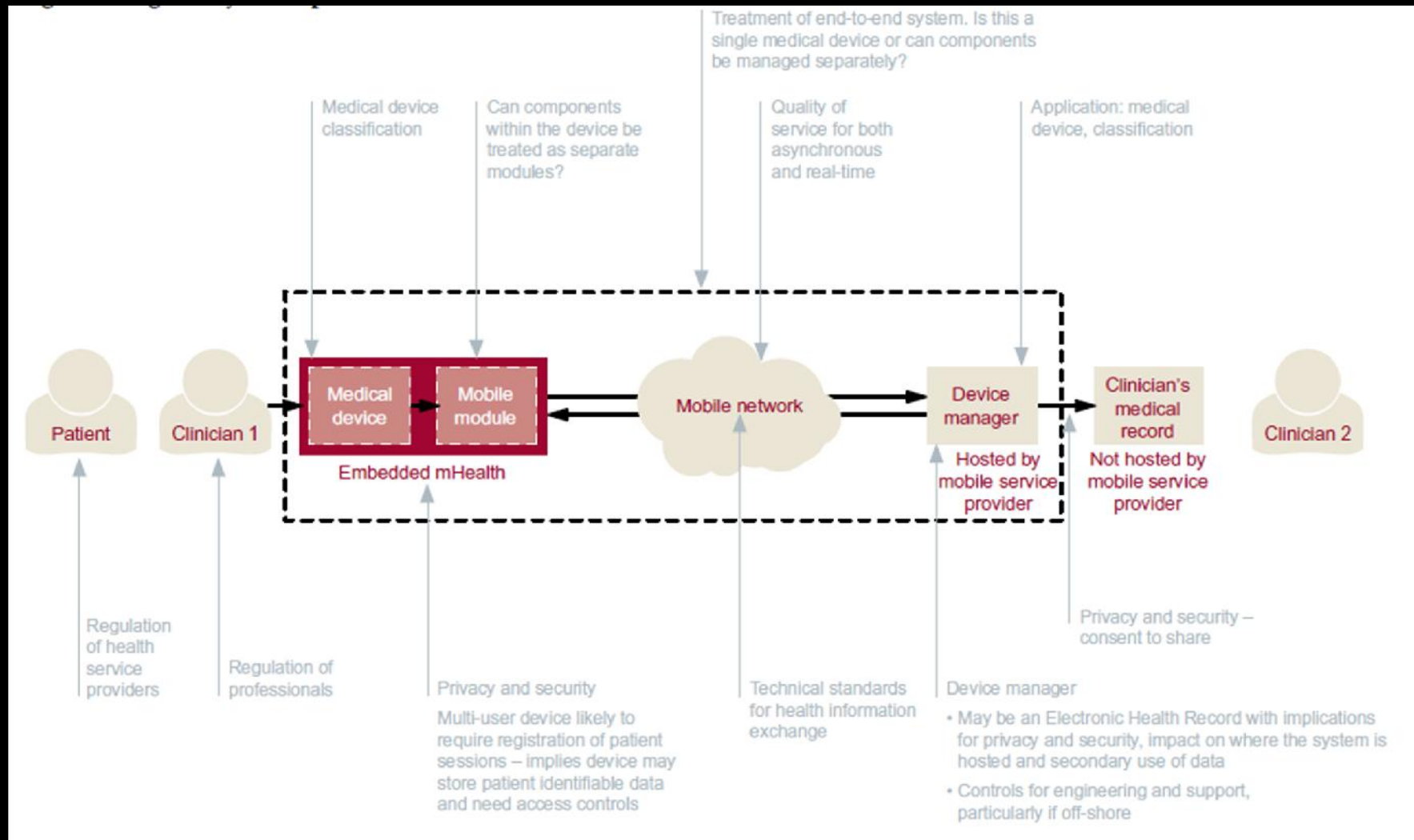
Ensuring safety and effectiveness

Healthcare policies and regulation for growth

Policy themes

Patient empowerment

Develop policies that promote user autonomy, which will in turn drive mHealth adoption

Reimbursement

Move towards reimbursement schemes that reward positive health outcomes and support the adoption of innovation

Regulatory themes

Devices

Introduce a proportionate approach to what constitutes a medical device and how it is classified

Systems and interfaces

Promote interoperability and common standards to enable scale and plug-and-play experience

Telecoms government and regulator engagement

Realising scalable and sustainable mobile health deployments

- Raise awareness of the benefits of mobile health

- Educate healthcare stakeholders on mobile capabilities

- Promote interoperability and common standards

- Provide spectrum for growth

- Support cross-industry initiatives
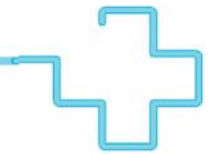
Ericsson Mobile Health Remote Patient Monitoring System

Peter Håkansson,

Manager Sustainability Research,

Ericsson

MODERN HEALTHCARE SYSTEMS
- CHALLENGES AND PAIN POINTS

Provide good care at an affordable cost + Increase the availability of care for all + Help people stay healthy + Demographic shift + Sharp rise in chronic diseases = ?

Healthcare mega trends

- Distributed healthcare
- Patient centric, personalized healthcare
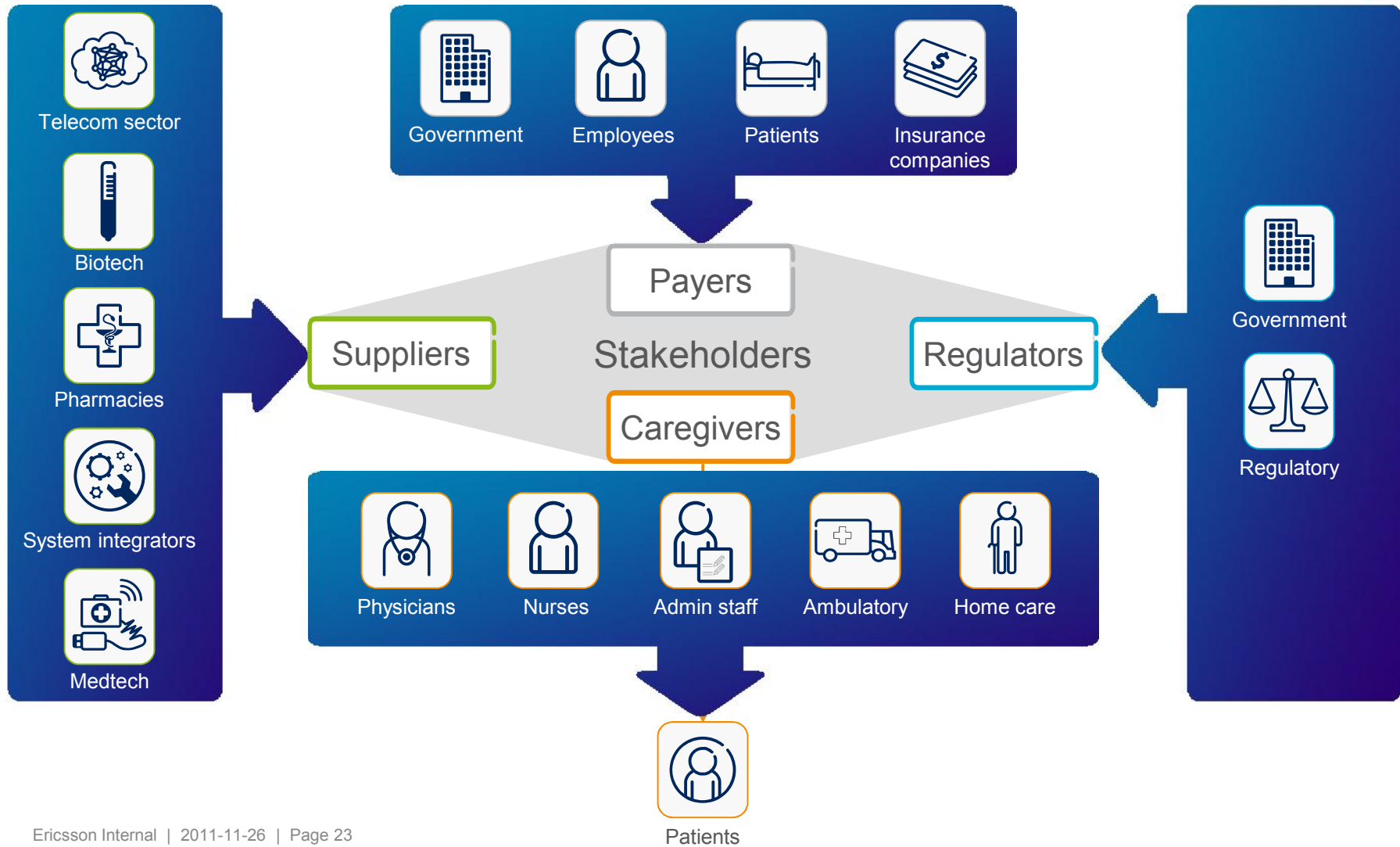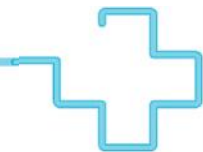- Higher demands from patients

mHealth is part of the solution

- Higher efficiency in care delivery
- Enabler for distributed care
- Mature technology

Mobile Health, mHealth is a term for medical and public health practice supported by mobile connected devices, such as mobile phones, patient monitoring devices, etc

HEALTHCARE: A COMPLEX ECOSYSTEM
- UNDER CONSTANT PRESSURE

Suppliers
- Telecom sector
- Biotech
- Pharmacies
- System integrators
- Medtech

Stakeholders

Payers
- Government
- Employees
- Patients
- Insurance companies

Caregivers
- Physicians
- Nurses
- Admin staff
- Ambulatory
- Home care

Patients

Regulators
- Government
- Regulatory

MARKET SEGMENTATION

PREVENTIVE CARE TOOLS

Help people stay healthy

- Wellness
- Behavioral change
- Community communication

CURATIVE CARE TOOLS

New efficient ways to treat patients

- Remote monitoring
- Assisted living
- Tele-consultations
- Compliance

PRODUCTIVITY TOOLS

Improve efficiency and availability

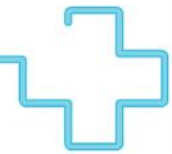- Professional communication
- Back office services
- Electronic Health Records

ERICSSON HEALTHCARE OFFERINGS
- HIGH LEVEL OVERVIEW

Health Information Systems

Health Information Exchange platforms that support healthcare delivery processes on national, regional or hospital level
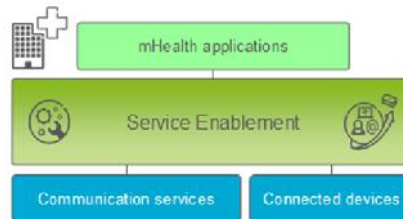
Remote Patient Monitoring

EMH is a remote patient monitoring solution used for measurement and transfer of a patients vital signs

Service Enablement for health

Sensor data and communication services aggregated, provisioned and exposed

Communication services

Horizontal communication services such as BCS, voice and SMS to be adapted and used in telehealth applications

Ericsson has both horizontal and health specific solutions for the healthcare market. Mainly indirect market channels like through operators and other enterprises
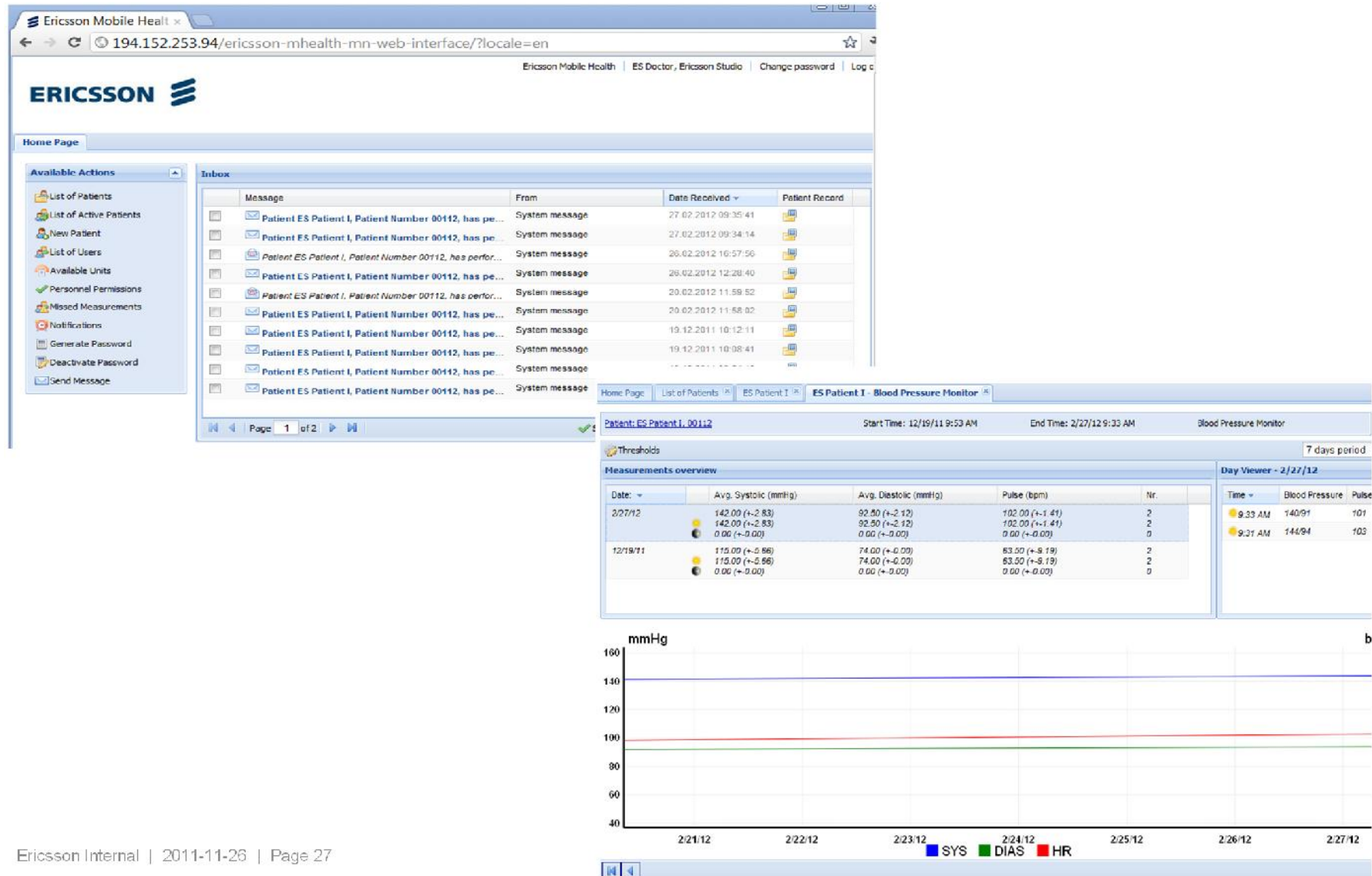
ERICSSON MOBILE HEALTH
REMOTE MONITORING USING MOBILE NETWORKS
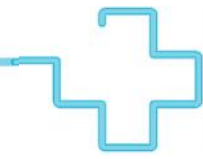
› Ericsson Mobile Health (EMH 3.0)

› *Remote monitoring system that is measuring body values and transmitting the data over mobile networks from patients to healthcare providers*
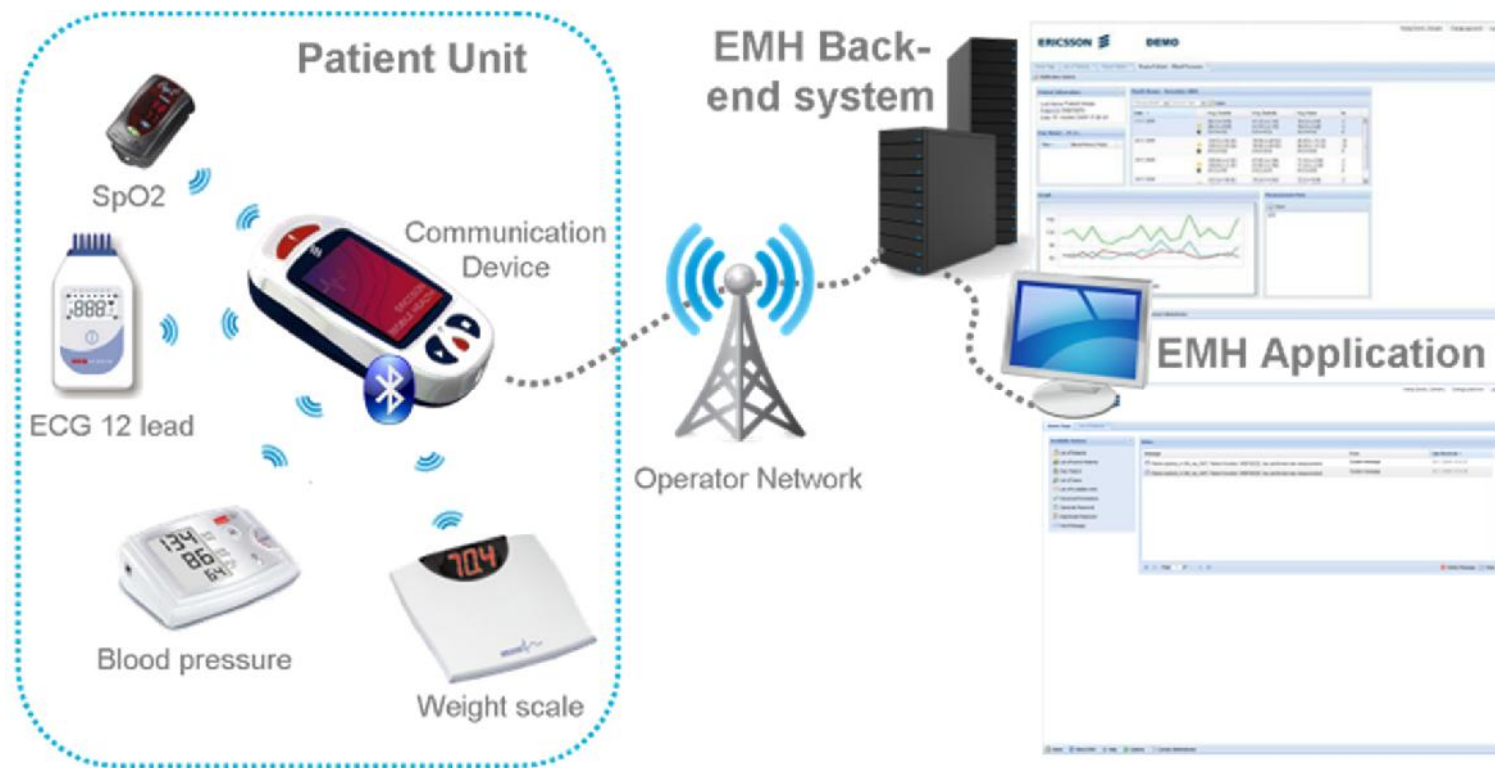
WEB INTERFACE

WEB INTERFACE
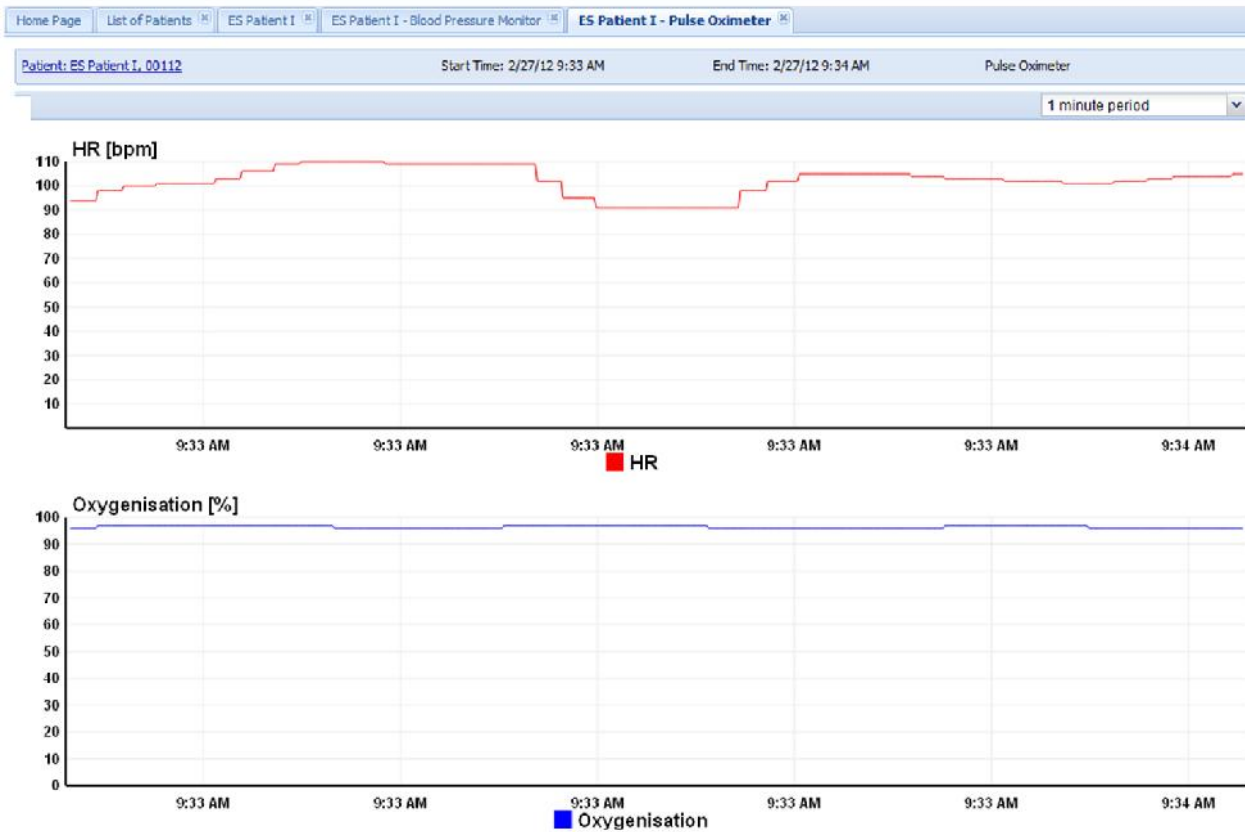
HEALTH SERVICE INTEGRATION

› The mHealth integration challenge:

- mHealth systems uses often proprietary communication interfaces and protocols

- This complicates for a caregiver to get a useful overview of data for a patient using multiple systems

Integrated services

Mortality (Heart failure)

-12%

-34%
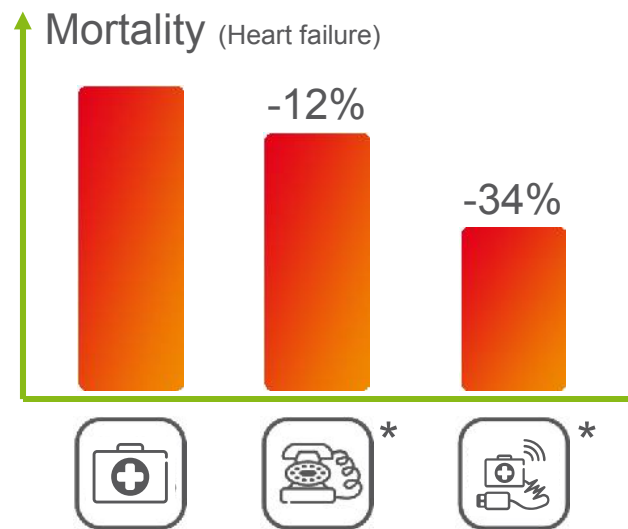
Caregiver view

* Structured telephone support or telemonitoring programmes for patients with chronic heart failure – Cochrane Meta Study 2010

USE CASE EXAMPLE
HIGH RISK HEART FAILURE PATIENTS

Treatment components

› Lifestyle changes

› Medication

› Hospital care

› mHealth

mHealth objective: early detection of medical complications by home monitoring and regular communication

› Measurement of weight, heart rate and blood pressure (daily)

› ECG measurement (when required)

› Subjective data gathering

› Medication compliance monitoring + reminders

› Patient communication (phone or videoconference)

ERICSSON

TARGET ARCHITECTURE, ERICSSON HEALTH & SERVICE ENABLEMENT

Health Domain

Health Information System

Hospital Information System

mHealth applications

Service Layer domain

Service enablement node

Communication services

Multiple sensors
(PAN:s, embedded modules, Apps, etc)

Telco domain

Network operator services
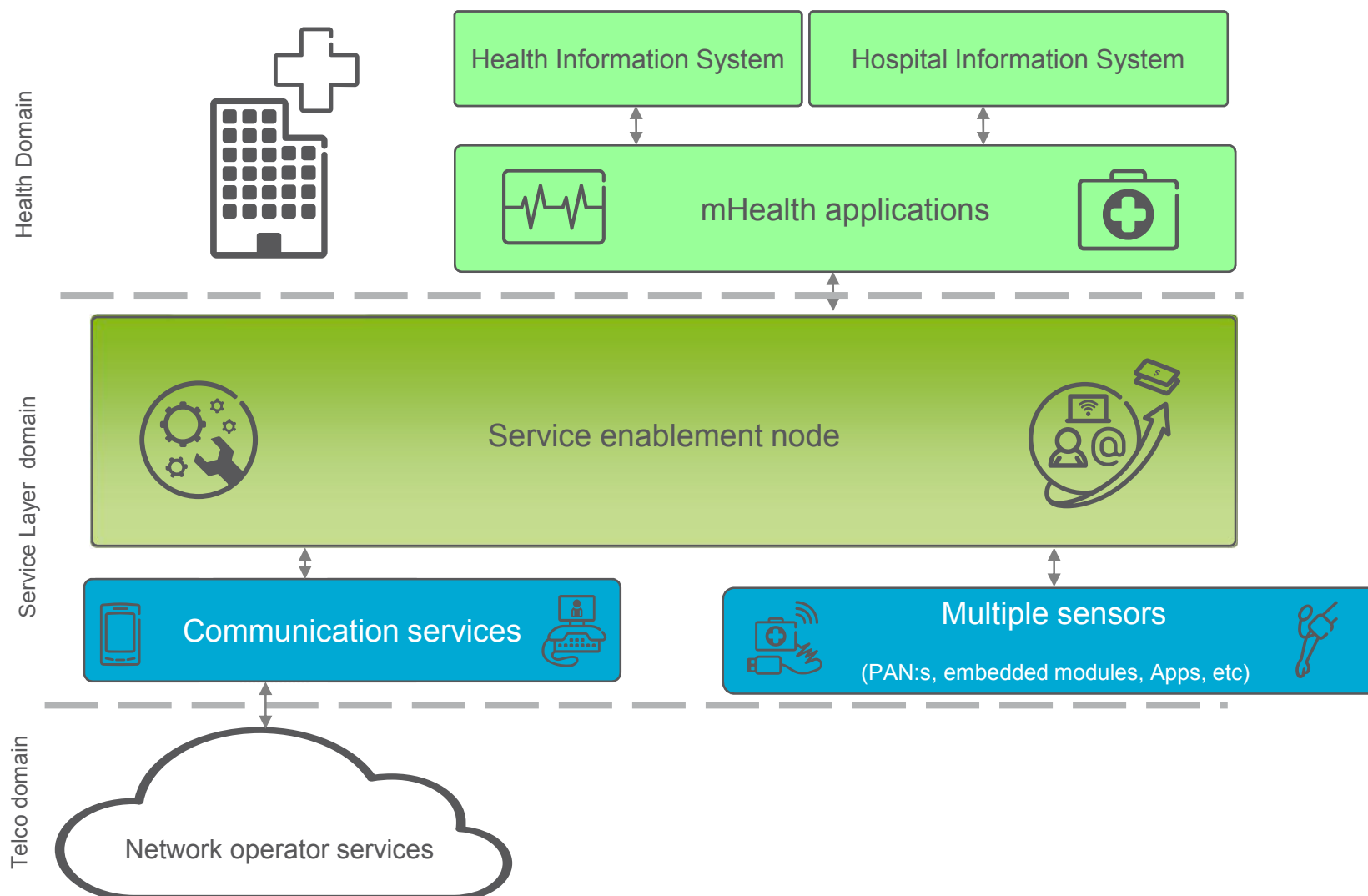
ERICSSON

THANK YOU!

PETER.HAKANSSON@ERICSSON.COM

AT&T Emerging Devices

Clay Owen,
Director of Communications,
AT&T

Rapid Growth of Connected Devices

U.S. Sales of WWAN Embedded Portable CE Devices
(in millions)

~60M

~1.7M

2008 2009 2010 2011 2012 2013 2014

- Digital Still Camera (DSC)
- Portable Nav Device (PND)
- Mobile Internet Device (MID)
- Netbook
- Portable Games Console (PGC)
- Portable Media Player MP3/4 (PMP)
- E-Book Reader (EBR)
- Tablets
- Notebook

Our vision is that by 2020, we will have **50 billion connected devices**

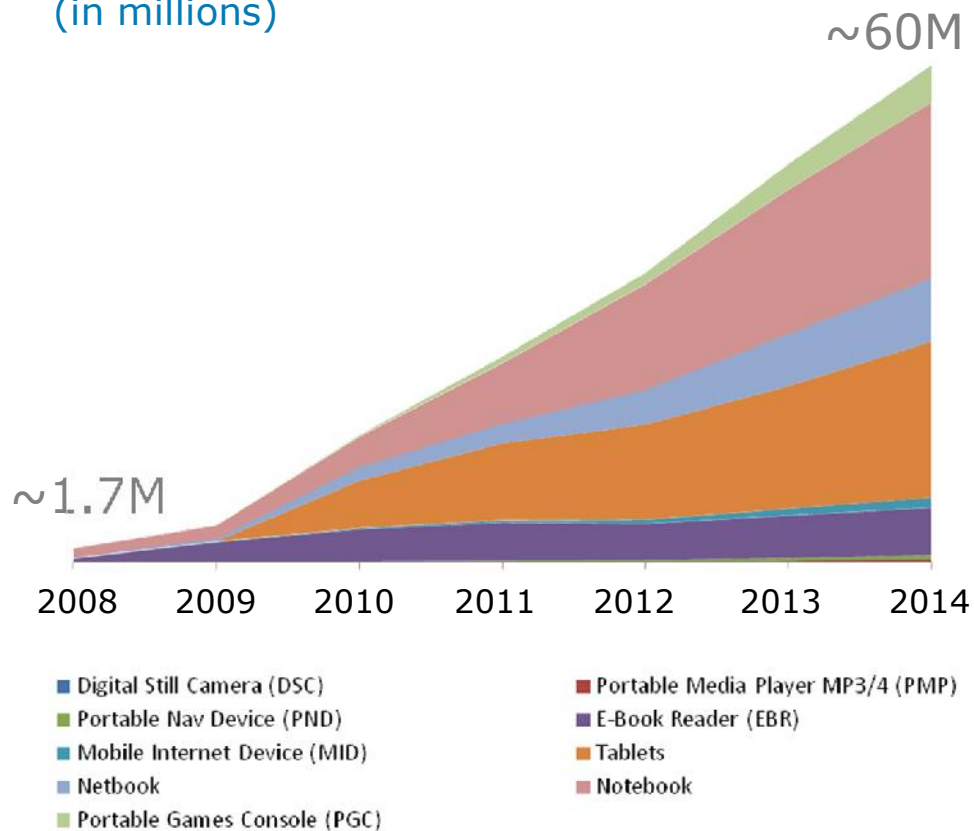- Ericsson CEO, Mar 2010

There will be **1 trillion devices connected** to the Internet by 2013

- Cisco CTO, Mar 2010

20 Billion connected devices by 2020

telecomseurope.net, Feb 2010

Available market for embedded CE devices is projected to grow at a **41% compound annual growth rate** (CAGR) in the US, through 2014.

- Strategy Analytics, Sep 2010

*Source: Strategy Analytics, WAN Enabled CE Devices US Market Forecast, Sept. 2010

A New Generation of Connected Devices

Computing

Automotive

Consumer Electronics

The AT&T Networks
Wireless + Broadband
Wi-Fi + International

Tracking

Connected Home

Healthcare & Fitness

2010-2011 Contracts and Launches

- Acer AS1830T notebook
- Acer AO532h netbook
- Amazon Kindle 3G with Special Offers
- Amazon Kindle 3G Touch
- American Security Logistics Pallet Tracker
- Apple iPad 3G
- Apple iPad2
- Automotive – Ford
- Dell Inspiron 1012 Mini 10
- Garmin GTU-10 - Tracking Device
- Garmin GDL40 - marine navigation device
- Garmin 1695 Connected PND
- Healthcare –
  - Exmovere – Connected Baby PJs
  - BlueLibris – mobile health and safety monitoring

- Zephyr - connected Bio-Harness
- Amber Alert GPS
- Vitality GloCaps
- Isabella Vizit Photo Frame
- PanDigital Photo Frame
- Sony PlayStation Vita
- Sony Reader (Gen2)
- Tablets –
  - Samsung 8.9" Tab P5
  - Acer Iconia
  - HTC Jetstream
- TVtextbook

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Flexible Business Models

Providing Options to Meet **Customer Demand**

Wholesale Data
Amazon Kindle

- ➢ Transport included with the book
- ➢ No subscription
- ➢ No device subsidy
- ➢ No connection between customer and carrier

Prepaid Data
Apple iPad

- ➢ Buy monthly 3G sessions as needed
- ➢ No contract
- ➢ No device subsidy
- ➢ Carrier distributes and connects with AT&T experience

Postpaid Data
Samsung Galaxy Tab 8.9

- ➢ Subsidized device
- ➢ 2-year contract
- ➢ 5 GB data per month
- ➢ Direct customer relationship with AT&T

What's going to be big in 2012...

2012 – New Opportunities for Growth

Automotive
Ford Focus EV
- Remote start
- Search for charging stations
- Stream content

Computing
Tablet Proliferation
- New options to meet evolving needs (entry level, laptop replacement)
- Leverage LTE networks for optimal streaming experience

Healthcare
Zephyr Bioharness
- Remote monitoring of human performance
- Enables capture of vital signs – heart rate, breathing rate, skin temperature, etc.
- Transmits data over the network to electronic health records and applications

Gaming
Sony Vita
- Mobile game downloads
- Multi-player connectivity anywhere
- Augmented reality experiences

CONNECT TO LEARN

70% of African girls don't get a secondary education.

When a girl is educated, she can earn 25% more income, 90% of which she'll invest in her family and community.

connect to learn

CONNECT TO LEARN PROVIDES

Access to secondary education through scholarships

Quality learning resources through broadband connectivity

A global **advocacy** platform for the importance of girls' education

connect to learn

ACCESS TO QUALITY LEARNING
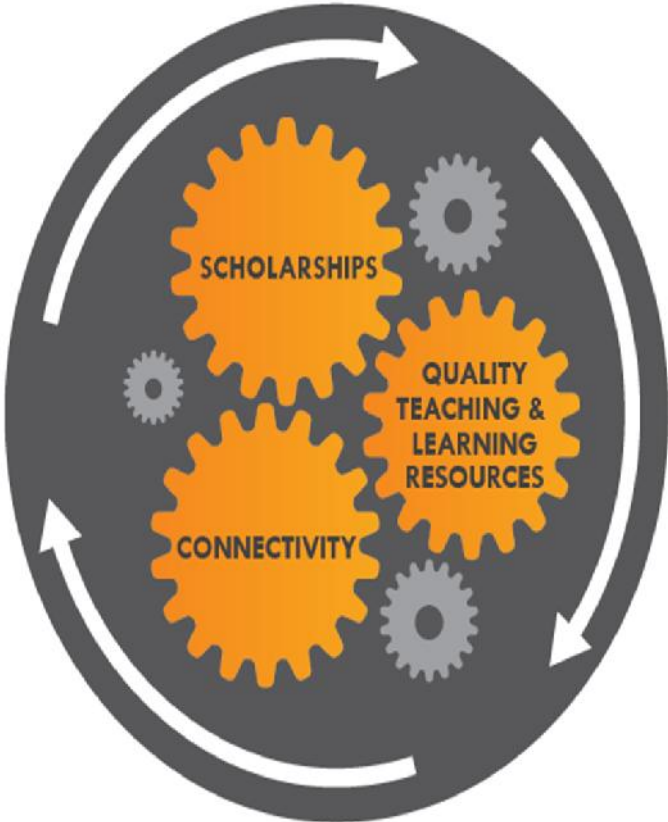
SIMPLICITY WITH CLOUD SERVICES

COMPLEXITY REMOVED FROM SCHOOLS TO SERVERS IN THE CLOUD

LOW COMPETENCE THRESHOLD

TEACHERS CAN QUICKLY START APPLYING ICT IN THE CLASSROOM

CONTENT CONTROL CAPABILITIES FOR SAFE INTERNET BROWSING

NO INSTALLATION, NO SOFTWARE UPDATES VIRUS FREE

ENERGY EFFICIENT, LOW RUNNING COSTS
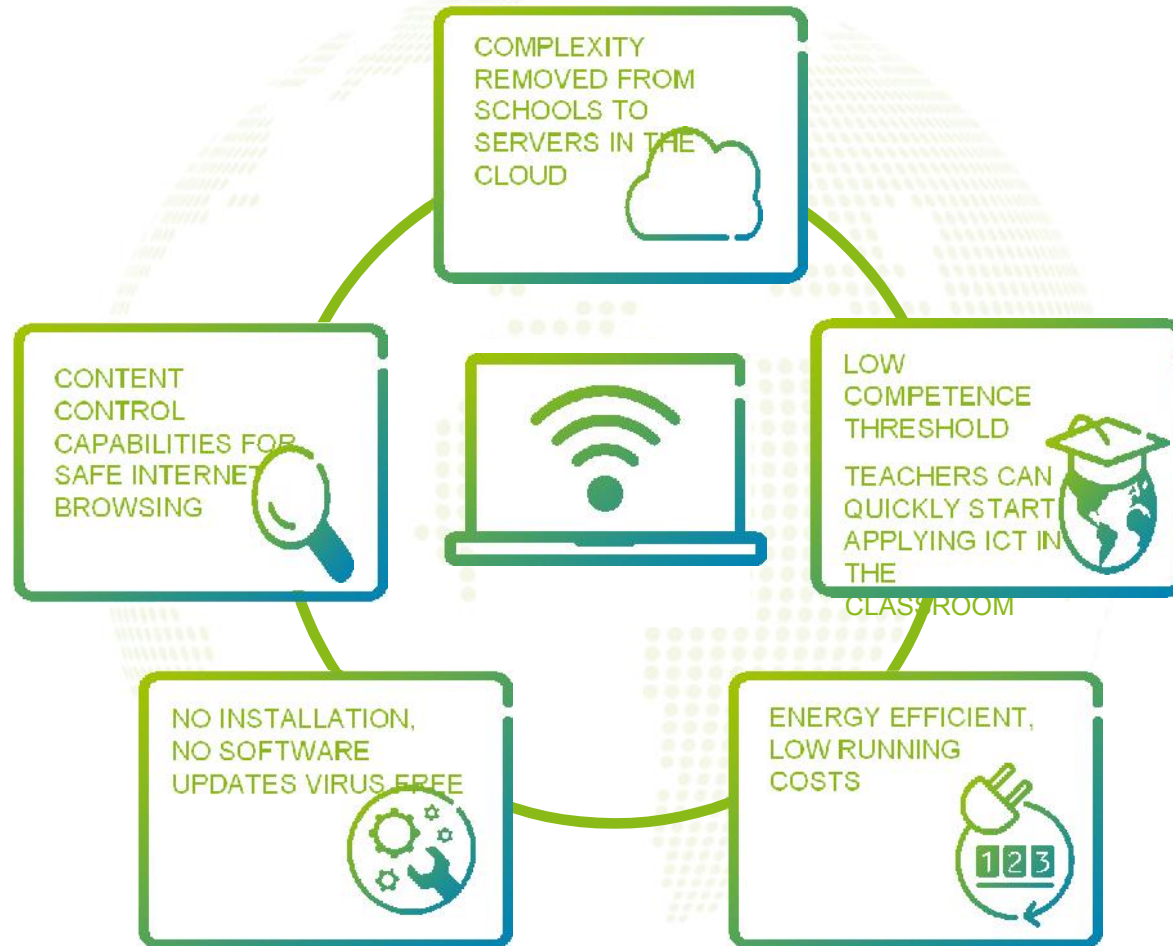
THIS IS EDUCATION-IN-THE CLOUD

Access Device:

Laptop/Tablet etc

+

Education apps and support from the cloud

+

Connected schools (MBB)

=

21st century learning solution
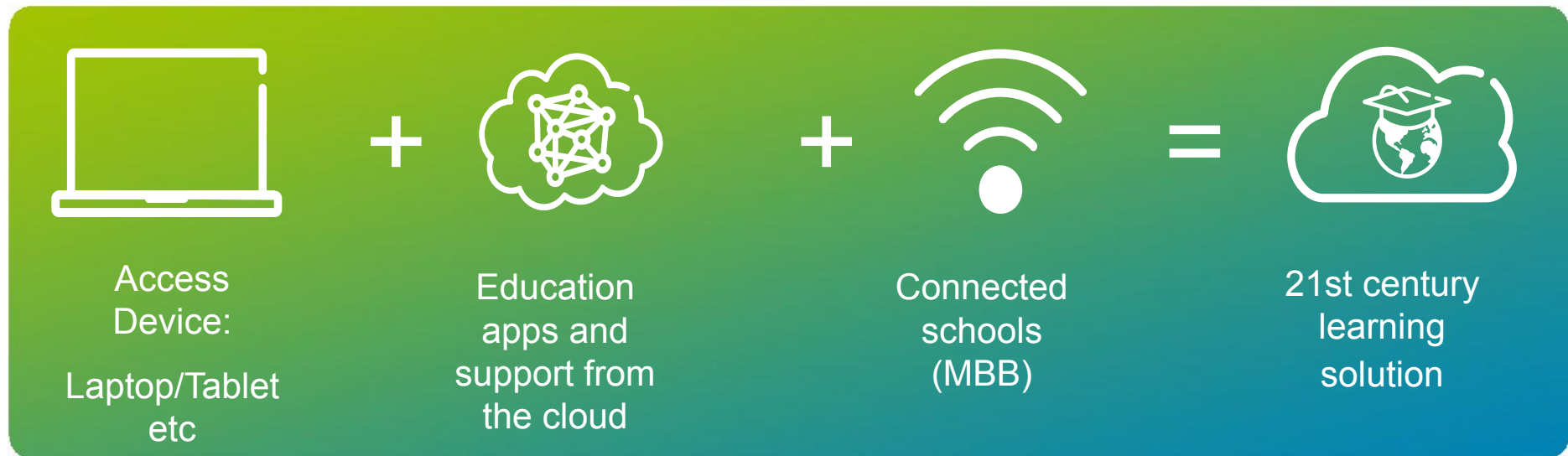
› **Simple**, **manageable** & **safe** for students
› **Cost-effective, scalable** accurate **usage information** for schools

connect | to learn

SCHOOL TO SCHOOL CONNECTIONS

School-To-School Connections Programs connect teachers to teachers and students to students for shared learning experiences and cultural exchange

connect to learn

CONTENT SERVICES

MDG Curriculum

Enabled by Ericsson cloud technology

AGGREGRATING

PACKAGING

PROFILING

DELIVERING

DISTRIBUTING
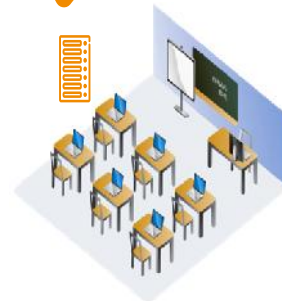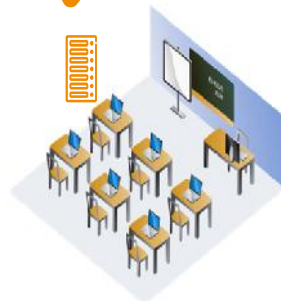
CACHING

MIRRORING

LOCAL HOSTING

MANAGING

SUBSCRIBING

UPDATING

SECURING

FILTERING

REPORTING

connect to learn

MONITORING & EVALUATION

Baseline for monitoring and evaluation across all global sites

Common methodology for implementation of M&E activities

Focus on socio-economic factors and business factors

GLOBAL DEPLOYMENT

SENEGAL (2012)

2 schools, 600 students*

GHANA (2011)

2 schools, 1070 students

NIGERIA (2012)

2 schools, 600 students

UGANDA (2011)

2 schools, 970 students

JAMAICA (2011)

1 school, 200 students

CHILE (2011)

4 schools, 700 students

INDIA (Planned 2012)

1 school, 200 students

DJIBOUTI (Planned 2012)

2 schools, 600 students

TANZANIA (2011)

2 schools, 550 students

KENYA (2011)

2 schools, 620 students

RWANDA (2012)

2 schools, 600 students

MALAWI (2012)

2 schools, 600 students

connect to learn

MOBILE BROADBAND MAKES IT POSSIBLE

› xxx

  › xx

  › xx

  › xxx

| By 2016 there will be 5 billion mobile broadband subscriptions | Broadband connectivity in schools provides access to quality resources | ICT partners support by enabling mobile broadband connectivity in schools |

connect to learn

FOUNDING PARTNERS

Planning For Data Growth: L-band Supplemental Downlink Spectrum Opportunity

Wassim Chourbaji,

Senior Director Government Affairs,
Qualcomm

The Internet of Everything

WHERE EVERYTHING IS INTELLIGENTLY CONNECTED

PLANNING FOR 1000X DATA GROWTH

Data Traffic Growth By 2015

MOBILE DATA
TRAFFIC GREW

>2x

IN 2010

AND IS PROJECTED
TO GROW

10–12x

FROM 2010–2015

Source: Strategy Analytics (March 2011).

Current Efforts to Meet Growing Data Demand

SPECTRUM

NETWORK OFFLOAD

NEW TECHNIQUES

HETNETS

Spectrum Opportunity — L-band Supplemental Downlink (SDL)

1452-1492 MHz
(Supplemental Downlink)

F1' F2'

FDD Paired[1]
(Downlink)

F1 F2

FDD Paired[1]
(Uplink)

F1 F2

L-Band (1452-1492 MHz) Key Opportunity[2]

- Harmonization ongoing in Europe and beyond, with 40 MHz of unpaired spectrum

- Other opportunities such as 700 MHz in the US with AT&T[4], are country specific

Downlink
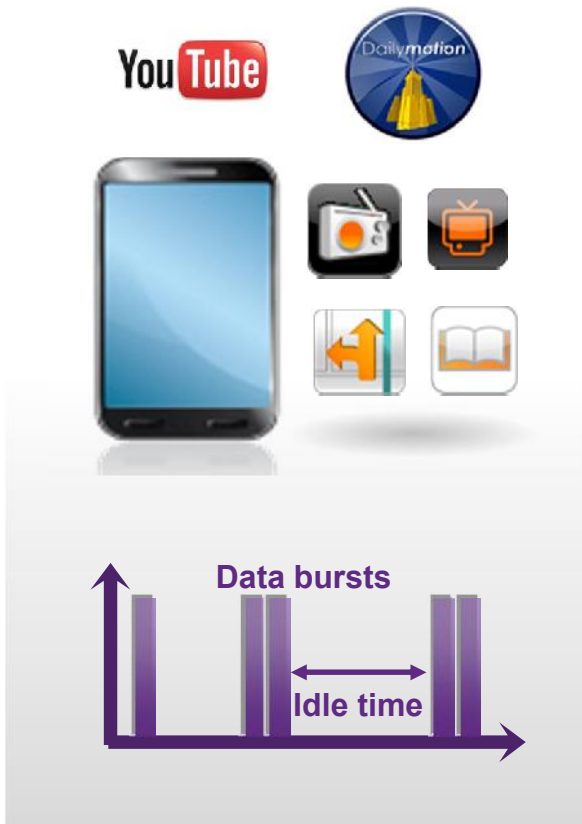
Uplink
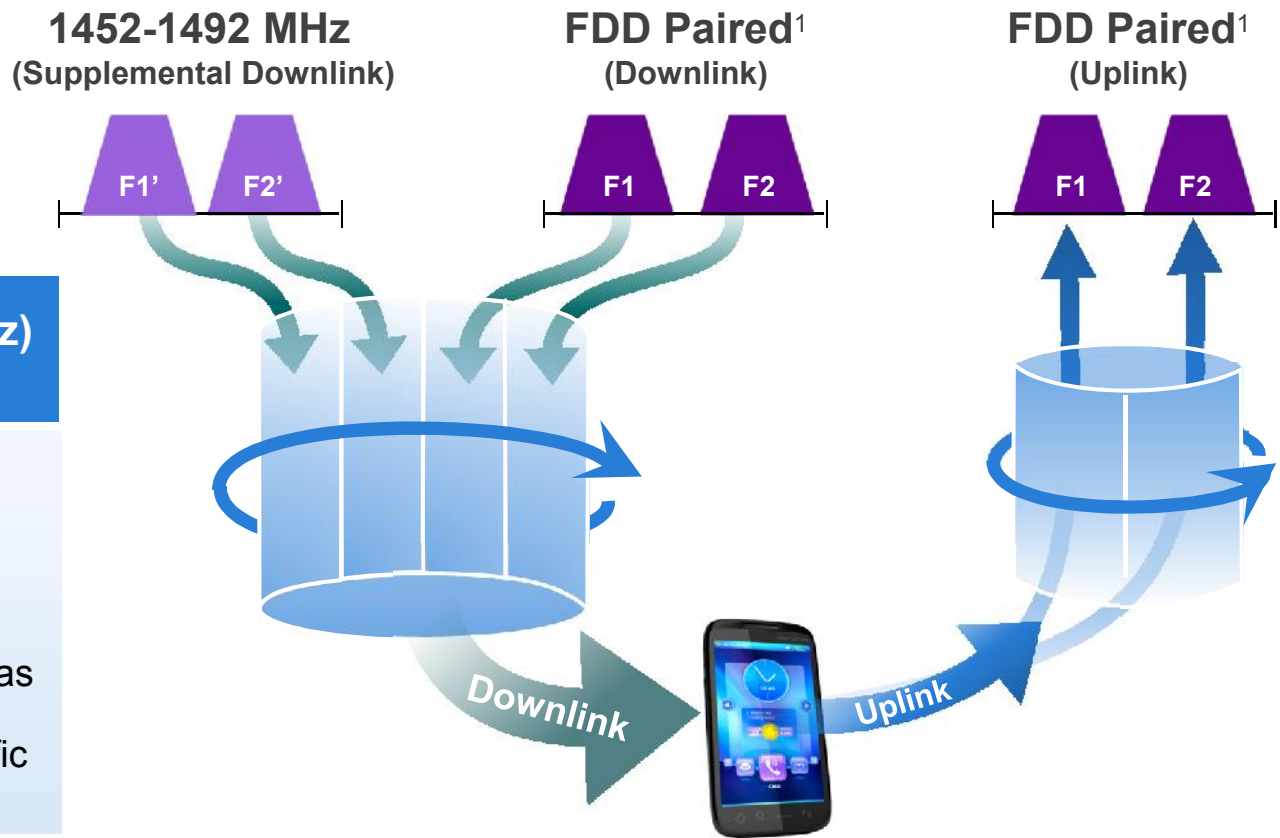
LEVERAGES HSPA+ MULTICARRIER
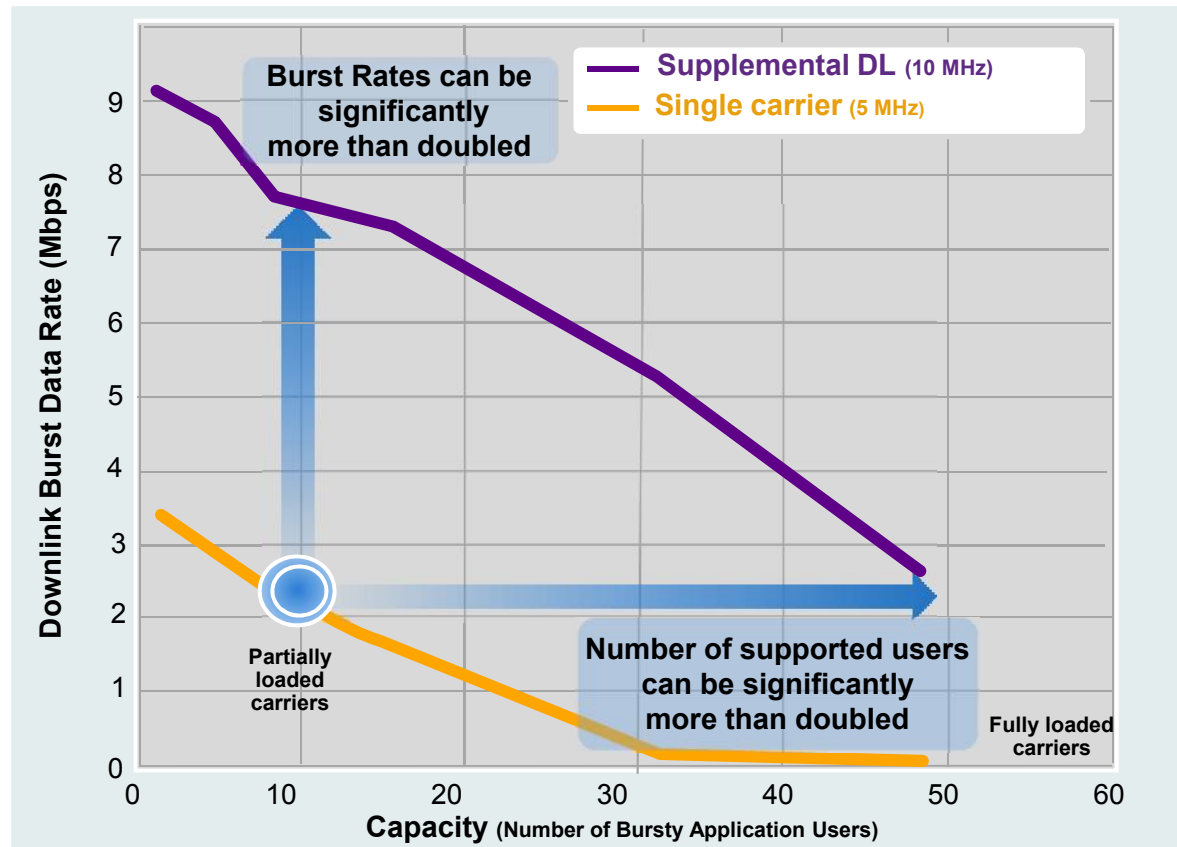ACROSS BANDS[2], OR LTE-ADVANCED

[1]e.g. 800 MHz, 1800 MHz or 2.1 GHz. [2]HSPA+ aggregation across bands already supported in 3GPP R9, but each additional band combination has to be defined in 3GPP. LTE Advanced (3GPP R10) introduces carrier aggregation. [3]L-Band 1452 MHz to 1492 MHz. [4]AT&T is planning to deploy supplemental downlink in lower 700 MHz

L-Band SDL Enables Faster Downloads, More Users & Enhances the User Experience
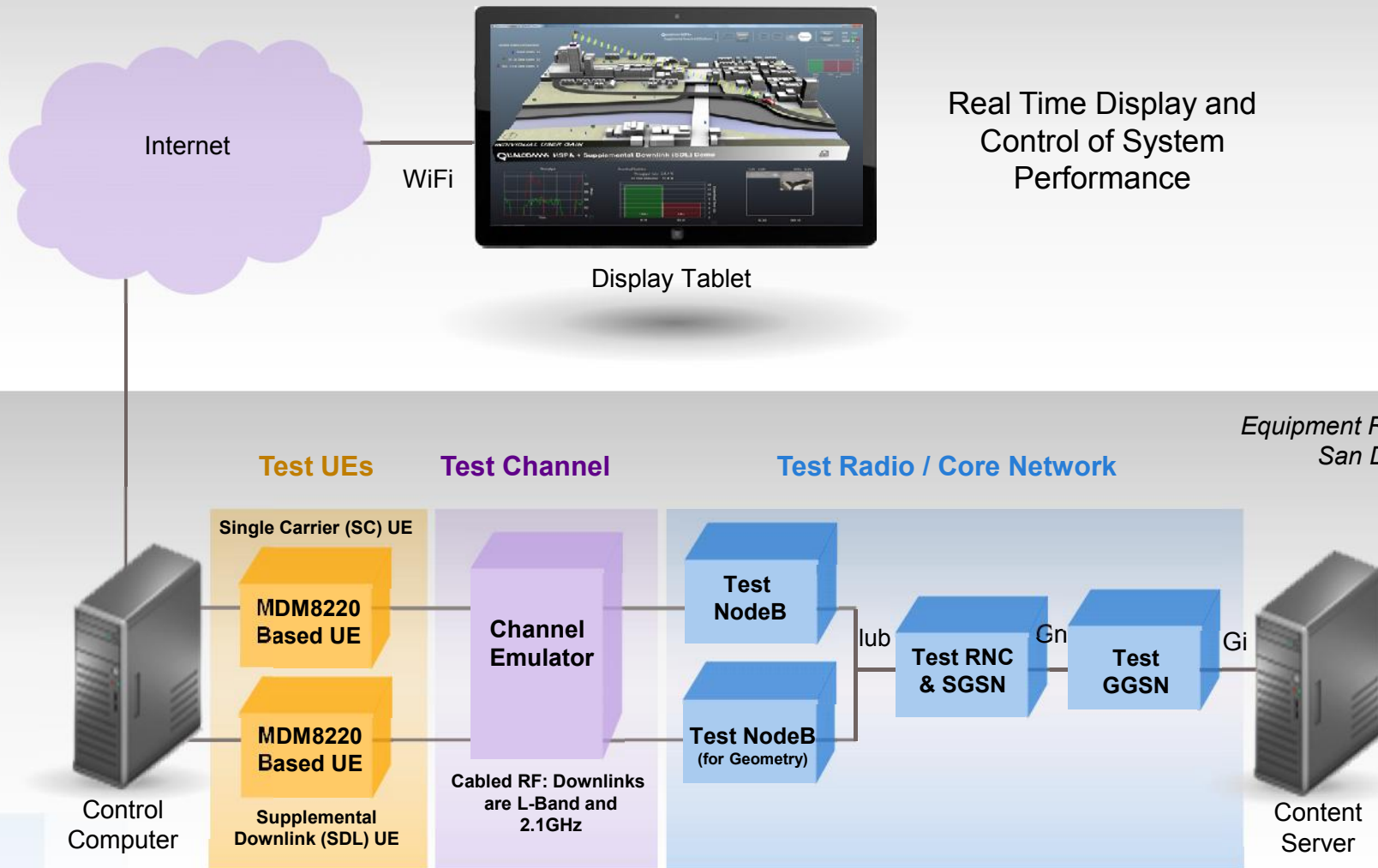
Bursty Data Applications

Data bursts

Idle time

**More than Double the Performance
with Supplemental DL (HSPA+ R9) configuration**

Burst Rates can be significantly more than doubled

Supplemental DL (10 MHz)
Single carrier (5 MHz)

Downlink Burst Data Rate (Mbps)

Partially loaded carriers

Number of supported users can be significantly more than doubled

Fully loaded carriers

Capacity (Number of Bursty Application Users)

Qualcomm simulations. 16 R99 users on anchor carrier and varying data users on 5MHz single or on 10MHz SDL carrier 1km ISD, PA3, Pilot Power = 10% Other Overhead Power = 20%. R99 user power consumption = 20%. Lower control overhead on the SDL carrier: 10%. The bursty nature means that a multicarrier can support more users at the same burst rate for partially loaded carriers. The gain depends on the load and can exceed 100% for fewer users (less loaded carrier) but less for many users (starting to resemble full buffer).

L-Band SDL Live Demo With HSPA+

Thank you

connectedliving@gsm.org