SMART NETWORKS
Smart Labs

Nokia Siemens Networks Smart Labs

Smart networks for smart devices

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Agenda

- NSN Smart Labs
- NSN Smart Lab Measurements (Messaging, VoIP, Gaming)
- NSN Smart Lab White Paper

NSN Smart Labs - world wide presence for years

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- Key Smart Lab Components
  - NSN first vendor to launch Cell-PCH year 2005
  - Direct Tunnel in 3G Network
  - Voice over HSPA
  - Network Controlled Fast Dormancy (NCFD)
  - Continuous Packet Connectivity (CPC)
  - HS DL FACH / HS UL FACH
  - Application Aware RAN in 3G

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NSN Smart Labs: Strong insight on user experience and network performance

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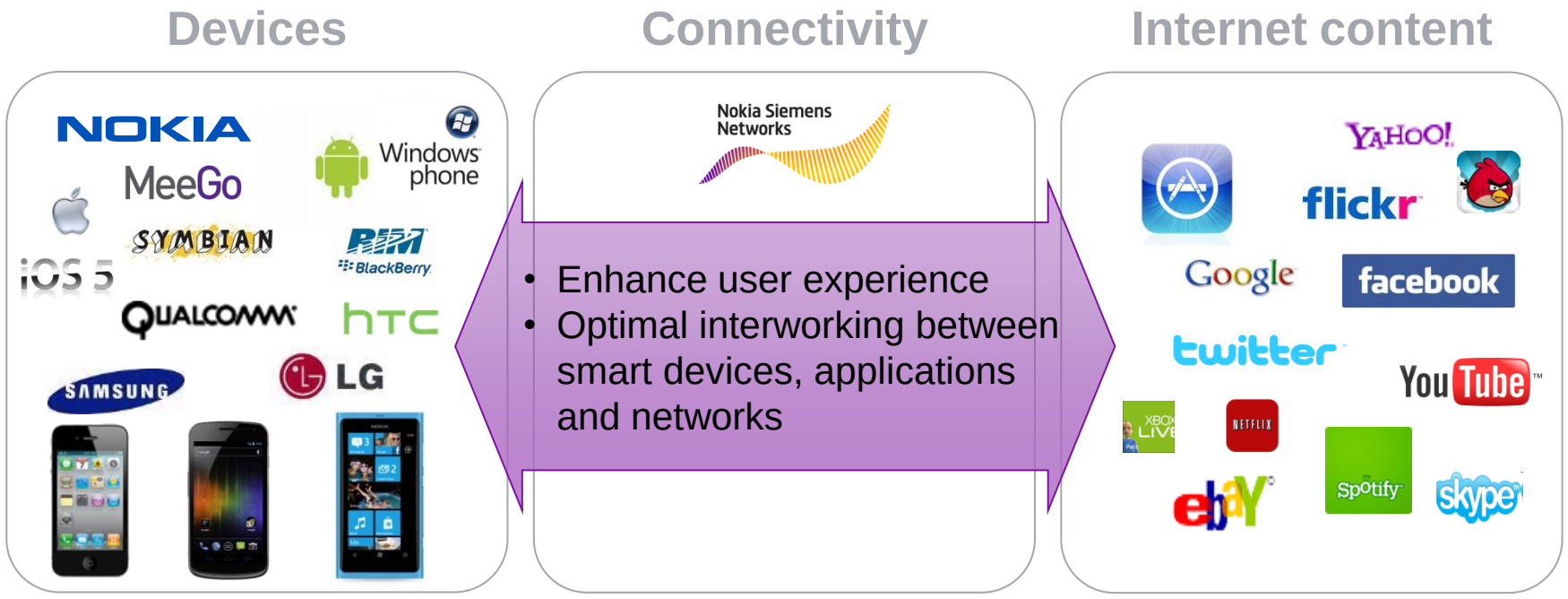
- Fully equipped with latest radio technologies and end-to-end IP network
- Foster mobile internet ecosystem and cooperation between key stakeholders
- Smart Lab Performance Advisor (SPA) for performance rating of applications and smart devices based on key network performance indicators



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Smart Labs activities

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End user experience testing

- **Application responsiveness**
- **Battery life time**

Applications with
- Smartphones: Android, iOS, Symbian, Blackberry OS, Windows Phone
- Laptops, Tablets

UE power consumption
- Fast dormancy
- Application behavior

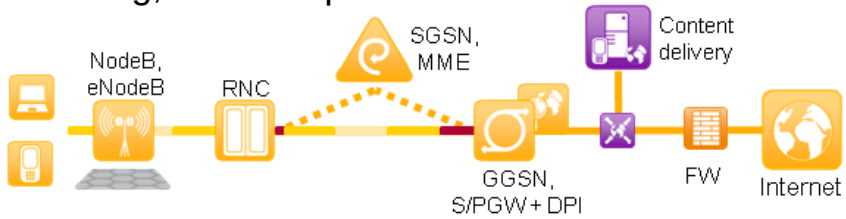
Application responsiveness
- User experience depending on network performance

Network performance testing

- **Traffic and signaling load**
- **Optimization guidelines**

Insight on network impacts
- Traffic and signaling load
- Recommendations for application developers
- Network optimizations with e.g. Cell_PCH, inactivity timers, CPC, direct tunnel optimization, fast dormancy profiling, HS-FACH

E2E network performance
- Radio access, packet core, DSN, firewalls, caching, content optimization



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Smart Labs testing wide range of applications

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Communication and collaboration

- Voice, video, messaging
- Consumer and business

Rich Communication Suite

Content

- Browsing, downloading and file sharing

- Streaming

Social and gaming applications

And many other…

- Navigation and location, well-being, M2M, payment, etc.

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Smart Labs E2E measurements overview

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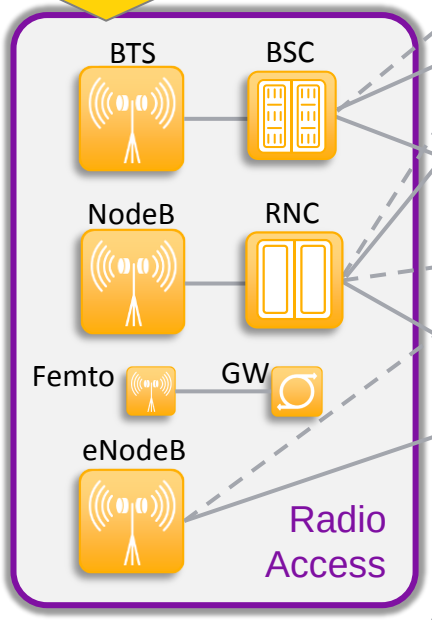
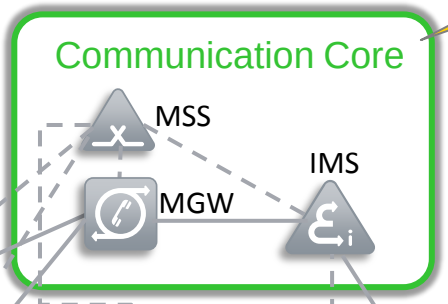
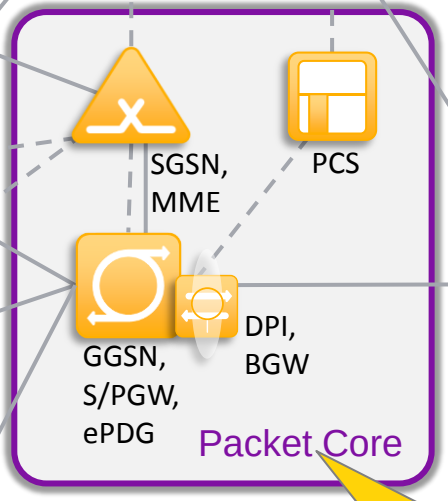
- User experience with device and applications
- Battery life

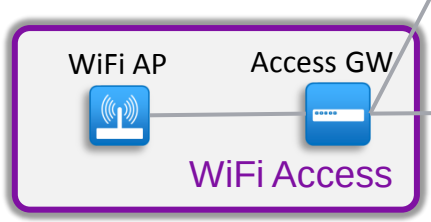
- Signaling and traffic impact on radio access
- Radio performance optimizations, QoS

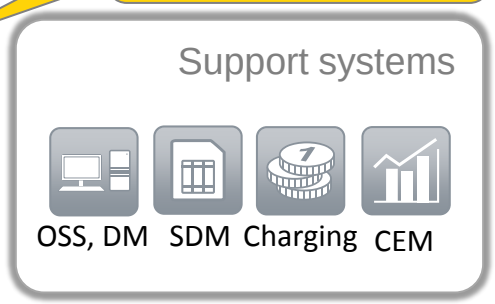
- VoLTE and CSFB performance

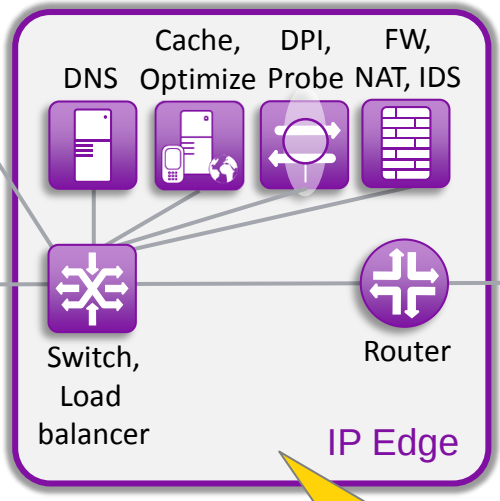












- Signaling and traffic impact on core
- Mobility performance optimizations, QoS

- Content delivery optimizations
- E2E networking performance

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Smart Lab study highlights: VoIP

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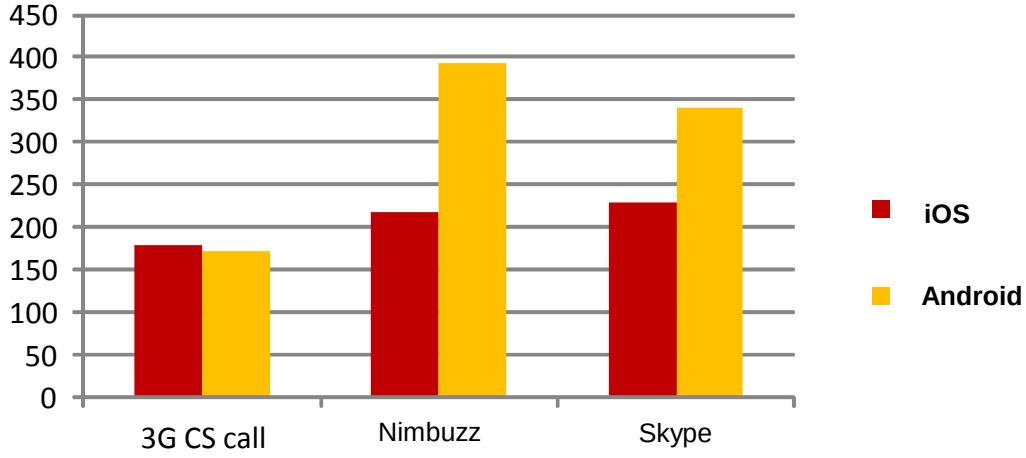
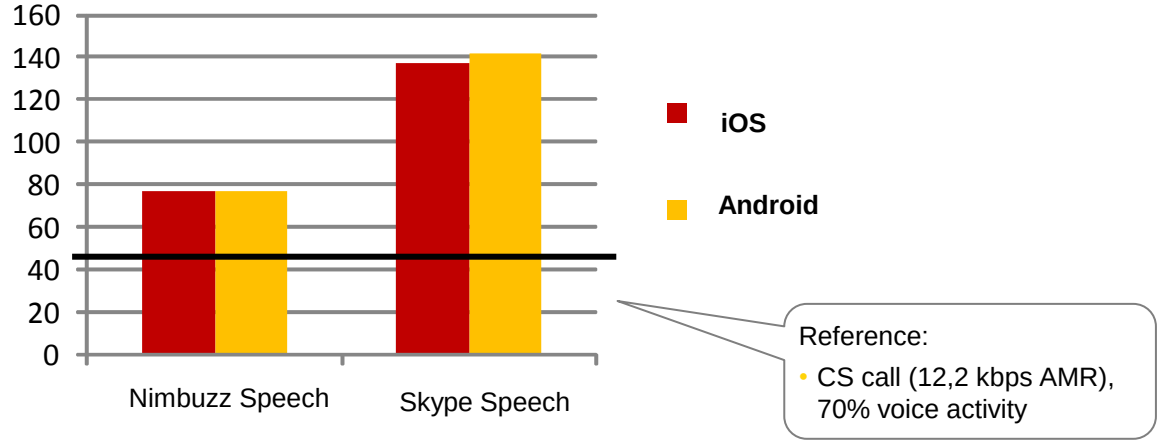
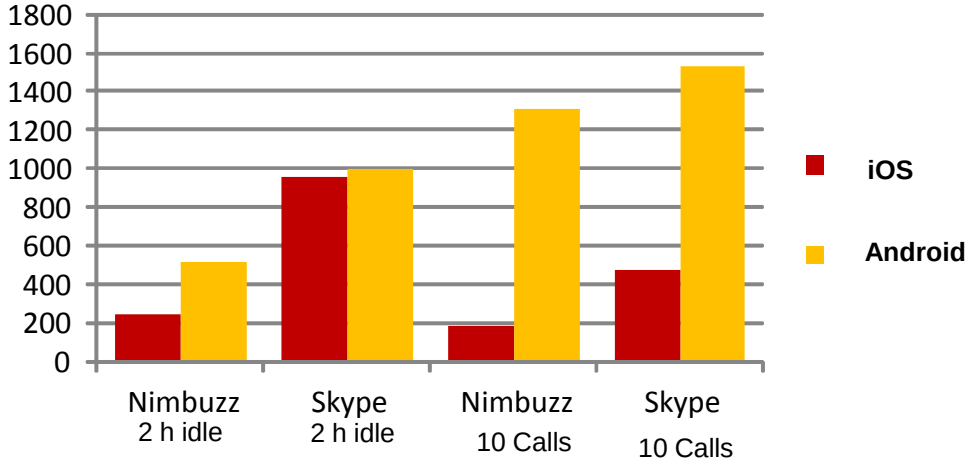
Average power consumption [mA] during voice call, Display off



VoIP call DL+UL capacity (kbps) IuPS and Gn interfaces



Number of 3G signalling messages



- **Battery life time**
- **Signaling**
- **Data volumes**
- **User experience**

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Smart Lab study highlights: OTT Messaging

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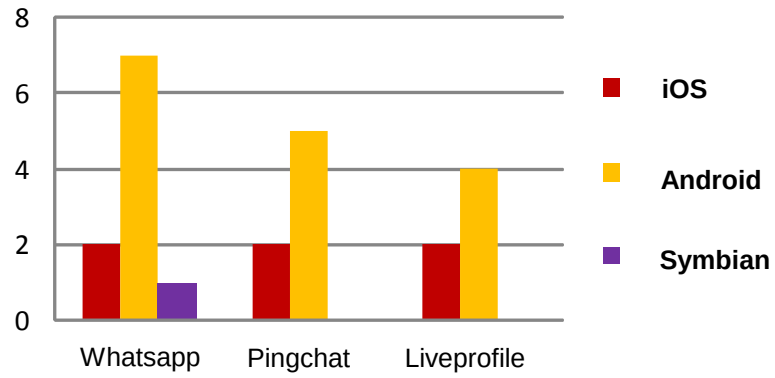
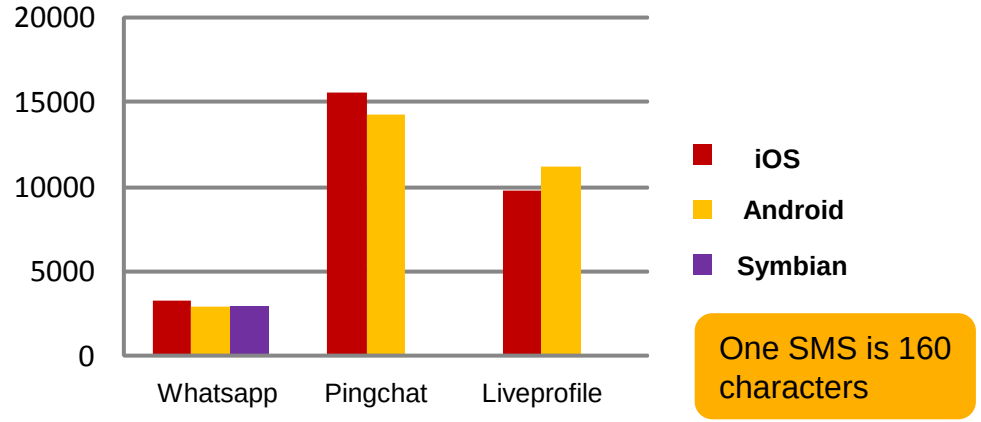
Number of RABs during conversation
3 messages sent & 3 received

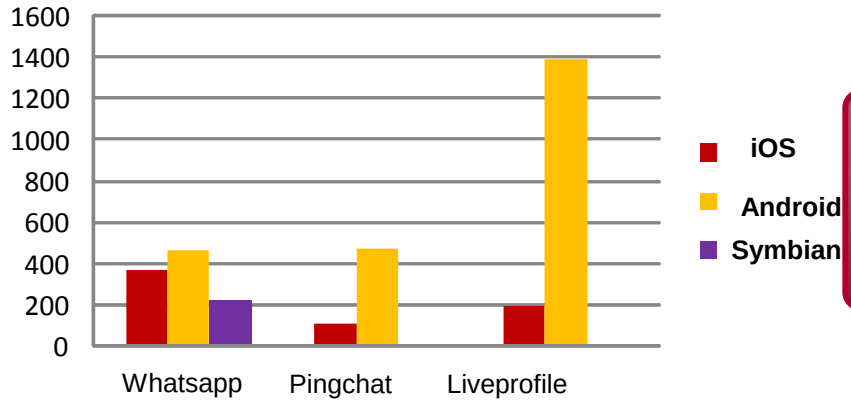


Total data amount (bytes)
One text message sent & one received



One SMS is 160 characters

Number of 3G signaling messages
1 h idle period



Always-on keep-alive messages and other application specific background transactions increase signaling load

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Smart Lab study highlights: Angry Birds

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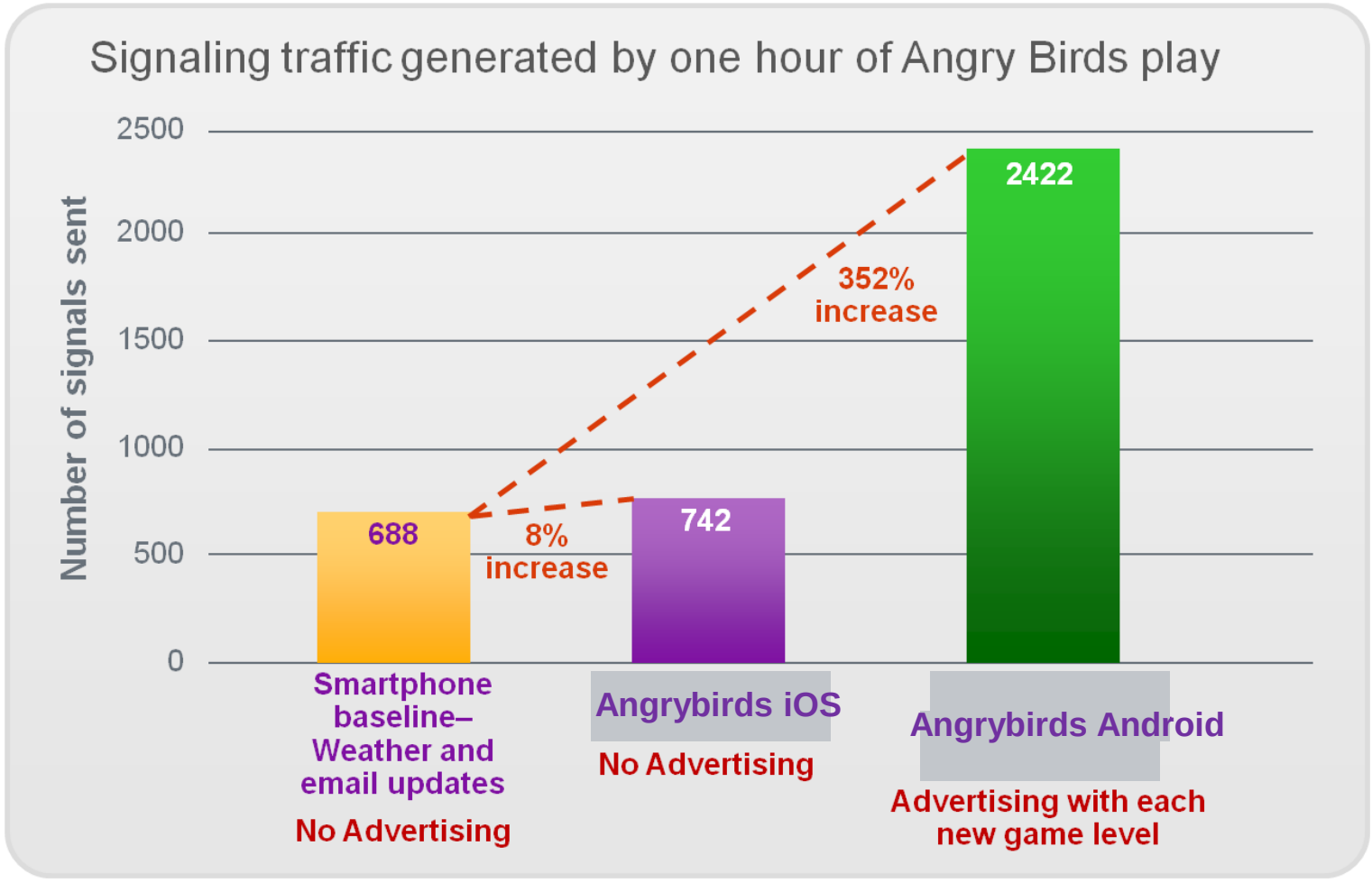

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White Paper

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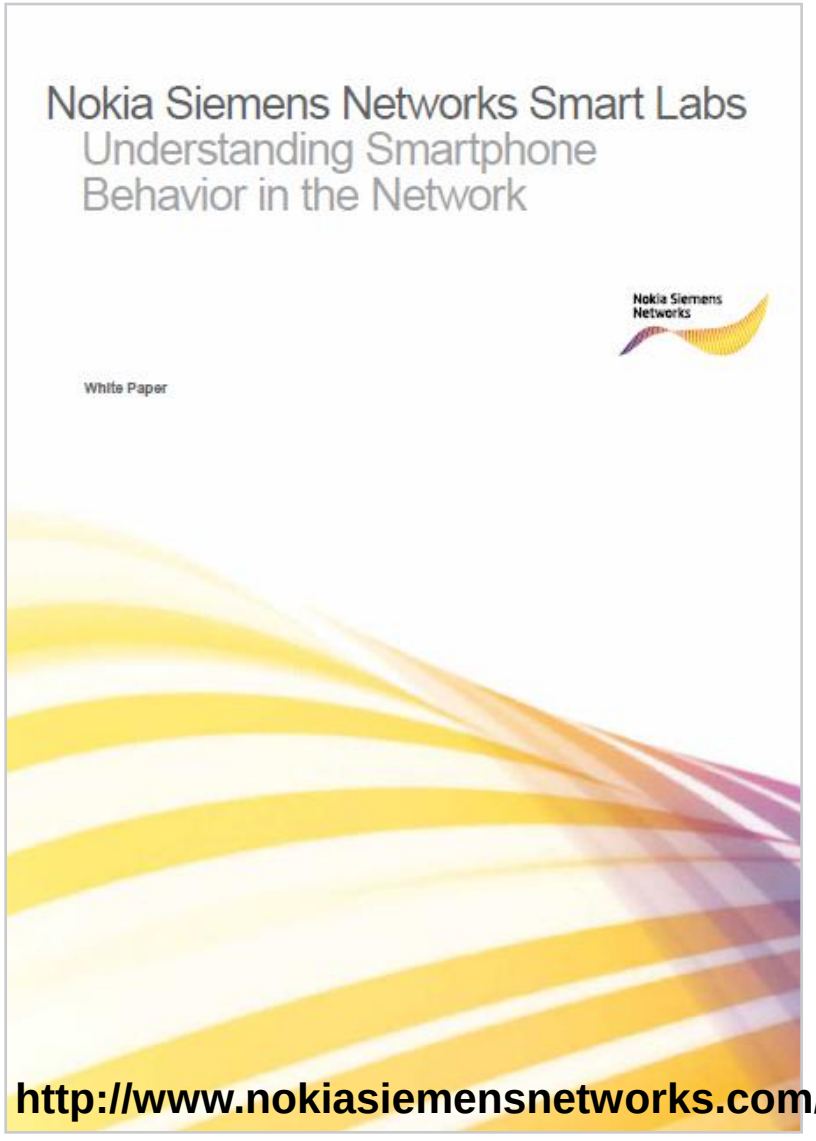

- Description of smart phone challenge
- Presenting Smart Labs
- Collection of discoveries
- Recommendations for operators
- Recommendations for device companies
- Recommendations for application developers

http://www.nokiasiemensnetworks.com/portfolio/solutions/smartphone-friendly-networks/smart-labs

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Thank you.

