

Scaling for Mass Deployment

Telefónica's Views on 3GPP Release 12

June 2012

Telefónica



Standards Expert



What society thinks I do



What my mom thinks I do



What my colleagues think I do



What my friends think I do

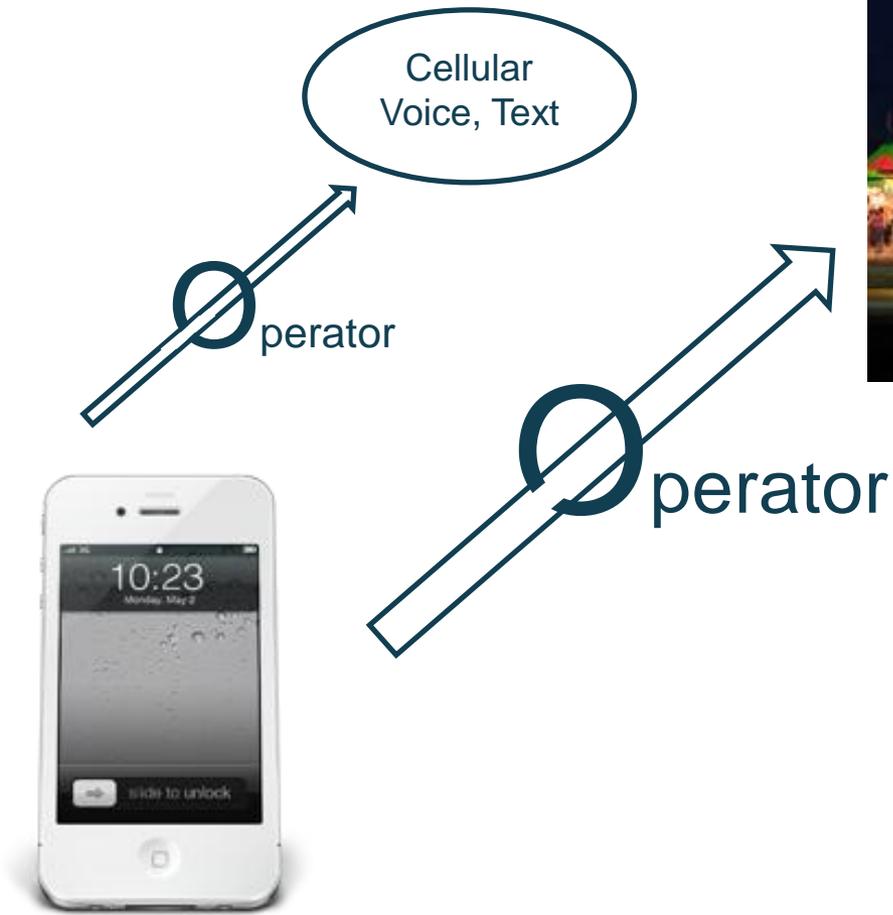


What I think I do



What I actually do

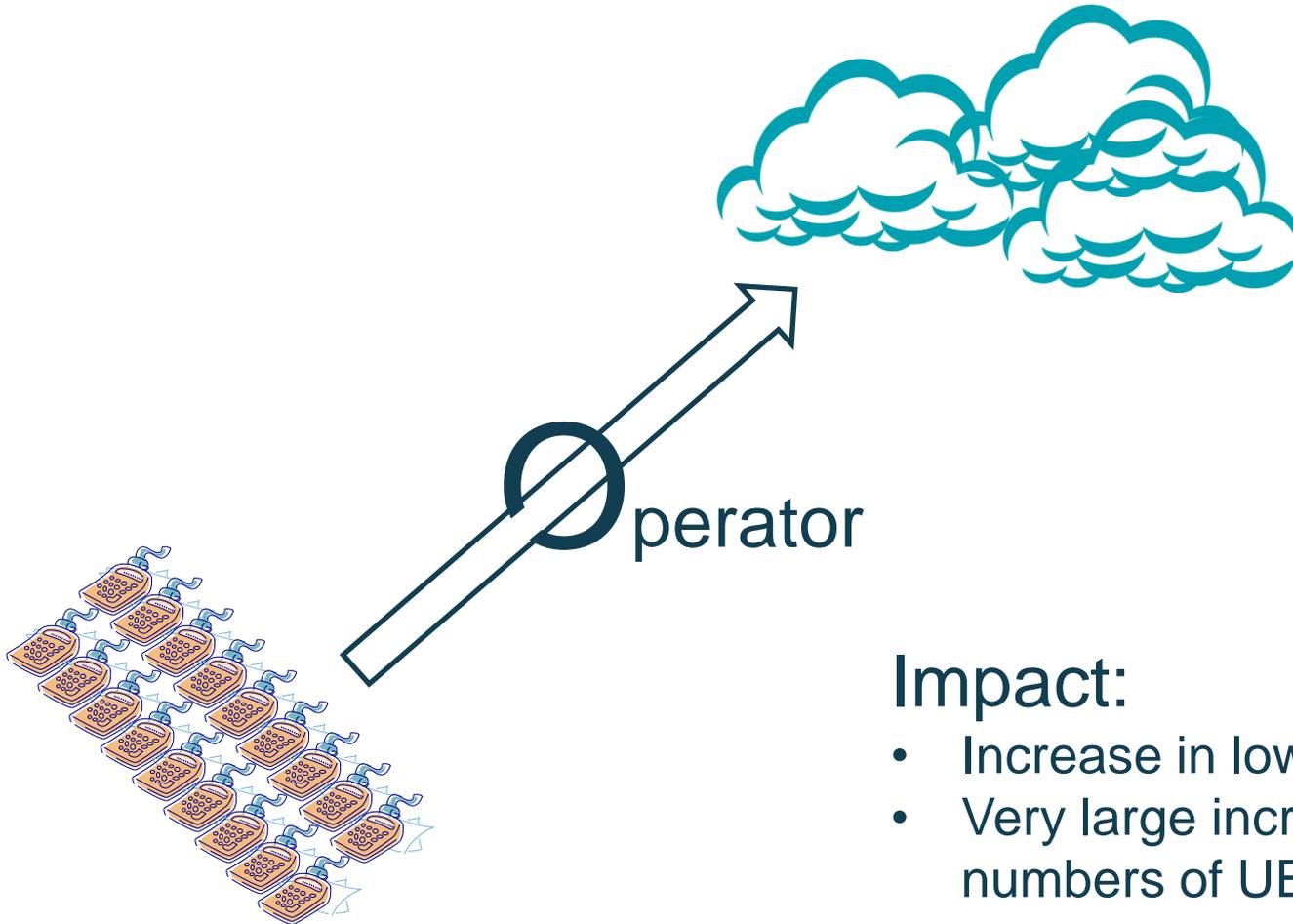
Operator – What the User thinks we do



Impact:

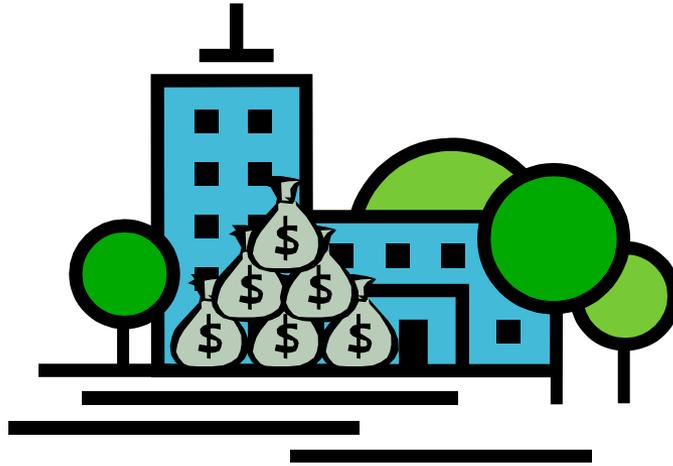
- Continued Voice, Text
- Reduction in revenue
- Increase in demanding traffic
 - Signalling
 - Keep-alive

Operator – What the Utilities think we do



Impact:

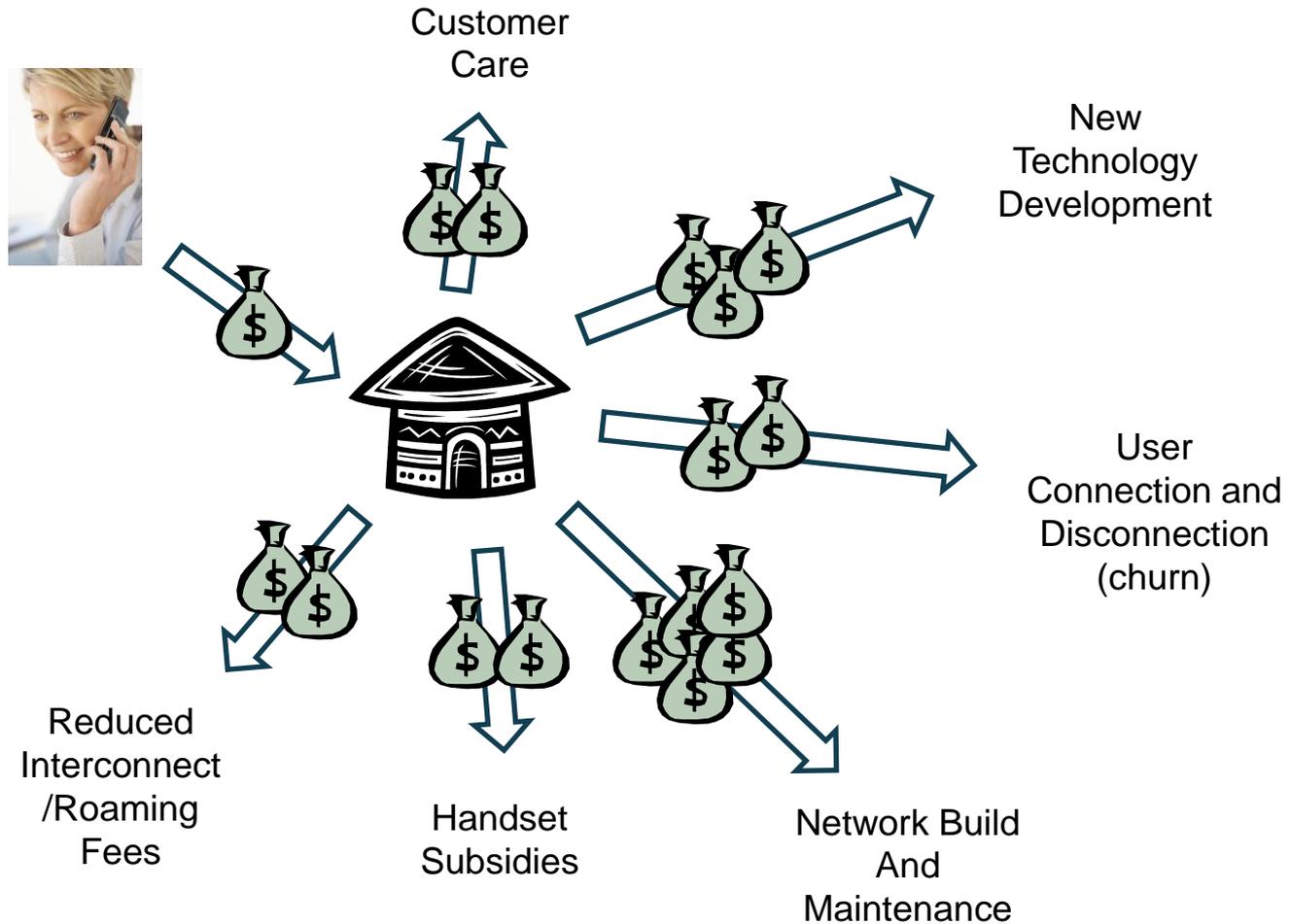
- Increase in low volume traffic
- Very large increase in numbers of UEs on standby



Impact:

- Increased regulation
- Reduction in interconnect rates
- Reduction in roaming fees

Operator – What we actually do



So what does this mean?

- Total Cost of Ownership (TCO) is becoming more and more important
 - Increasing speed while maintaining current cost models is no longer acceptable
- We need increased flexibility and automation
 - To better cater for highly capable and demanding smartphones
 - To better cater for mass deployment of machine type devices
 - To cater for new operator charging policies
 - To cater for new services (e.g. presence/location based)
 - To cater for massive deployment of small cells at low cost
- We need to lower TCO as our ARPU reduces
 - New customers will pay very little
 - Machines
 - Emerging Markets
 - Spread of over-the-top “free” services
 - Increased regulation reducing interconnect/roaming fees

In RAN terms...

- Integration of key non-3GPP access technologies into the 3GPP framework
 - Improving flexible bandwidth usage across the operator's radio estate
 - Increasing area spectral efficiency
 - 3GPP and non-3GPP (WiFi) technologies working together seamlessly
- Major reduction in network configuration cost
 - by enhanced Self-Optimising Networks
 - by improving Energy Efficiency
- Improvements in Coverage
 - Increase indoor coverage, enabling high throughput connections
 - Provision of a continuous managed QoS in the coverage area

Technology Consequences

Area spectral efficiency

- Increase in number of high-demanding users & number of connected objects
- Capacity Targets measured in Gbps/Km²
- Post LTE-A Available bandwidth will not be able to cope with new needs alone
- Ultra small cells technology needed

New services enablers

- Presence based services, location based services, UE environment awareness
- High throughput demanding services (HD video or 3D video)
- Low latency services (games, security, ...)
- M2M based services, with different focus from conversational services

Offloading

- Offloading mechanisms from macro radio resources as soon as possible
- Ultra small cell technology , aiming for maximum spatial reuse of bandwidth
- ICIC for ultra small cells is the main challenge
- High throughput coverage continuity

New architecture and SON

- Best possible radio access in each situation
- Resilient, adapting to unplanned and changing network and user needs
- Low cost access nodes CAPEX and OPEX
- SON improvements in energy efficiency & interference control for overlapping layers

Technical Enhancements

- Extend QoS capabilities to include interworking with non-3GPP (WiFi) radio access technologies
- Provide smooth perceived QoS on the full coverage area
 - Making maximum use of all network nodes (e.g. using CoMP technology)
- Improve SON with focus on lowering OPEX expenditure
 - Reducing manual daily optimisation efforts.
 - Reducing the expertise/knowledge required by staff for new deployments
 - Reducing installation time
 - Plug & play approach for new nodes integration on the already existing network
 - Including configuration of the new node AND reconfiguration of the existing nodes
 - Also include removal of nodes
 - Self awareness and adaptation procedures for changes in network environment
 - Including both permanent and temporary environment changes
- Empower UEs by providing enhanced network information
 - enabling smartphones to be aware of network status (current and expected future load)

Additional Technical Enhancements

- Provide mechanisms for Flexible Bandwidth Exploitation
 - Carrier Aggregation is just a starting point
 - Extract value from underutilized radio resources (2G/3G/LTE)
 - Provide guided access to unlicensed bands (WiFi)
 - Enhance mechanisms to allow the UE to cover multiple bands/bandwidths
 - Enable Spectrum Sharing mechanisms between co-operating operators
 - Facilitate the usage of new high frequency bands, which are more bandwidth capable
 - Extract value from more advanced spatial multiplexing techniques
 - such as Beamforming and CoMP

- Reduce energy consumption
 - Approx 30% OPEX is energy consumption of which approx 50 % is power amplifiers
 - Specify low power nodes which use energy harvesting systems, such as solar panels

Summary Of Proposals

- Enhance Radio Resource Usage Coordination
 - Increase the area spectral efficiency through new architecture
 - Improve LTE co-ordination with 3G/2G and non-3GPP (WiFi) networks
 - Provide consistent, smooth QoS across the coverage area
 - Maximise available radio resource usage
- Improve Features for handling data applications
 - Bursty traffic
 - Enriched services (low latency, presence-aware, UE-environment-aware)
 - Machine Type Communications
 - ...whilst dividing the throughput optimally via intelligent QoS allocation
- Improve Energy Efficiency
- Improve Capabilities for small cell deployment
 - Dramatically improve SON capabilities
 - Improve Interference Cancellation Techniques

Overall Goal Is Not Headline Speed

Adapt To New Usage Paradigms

Prepare for Mass Scale Low Cost Deployment

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