Services and System Aspects (SA)

LTE Africa

11.11.2014

Balazs Bertenyi – Chairman of 3GPP TSG SA

NOKIA

A GLOBAL INITIATIVE

Outline

- 3GPP facts and numbers
- 3GPP Releases and Timelines
- Key features and trends
  - Stability and Capacity
  - Growth
  - Architecture trends
- Summary

3GPP – facts and numbers

Technologies

Radio Technologies

- 2G radio: GSM, GPRS, EDGE
- 3G radio: WCDMA, HSPA
- 4G radio: LTE, LTE-Advanced

Mobile Core Network

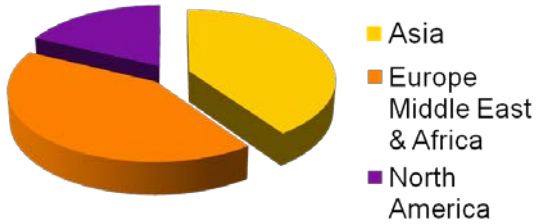
- 2G/3G: CS, GPRS
- 3G/4G: Evolved Packet Core (EPC)
- IP Multimedia Subsystem (IMS)
- Security Assurance
- Policy Control
- Charging and O&M

Service related aspects

- M2M

Organization

Meeting Delegates by Region

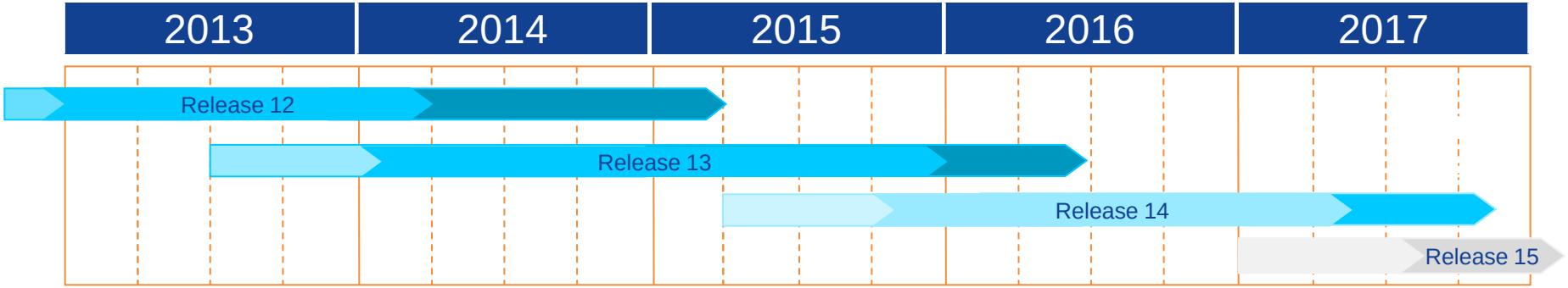


Numbers

- 50.000 delegate days per year
- 40.000 documents per year
- 1.200 specs per Release
- New Release every ~18 months

Consensus based decision makin

3GPP Release timelines



- Release 12 getting close to finalization
  - ASN.1 freeze set for March/2015, this represents the true Release freeze
- Release 13 timelines are tentative
  - Realistic Release freeze in mid-2016 the earliest

Release 12 system features

3GPP access

Usage Monitoring Control PCC enhancement
Group Communication System Enablers for LTE
Machine-Type and other mobile data applications Communications enhancements
Policy and Charging Control for supporting fixed broadband access networks
Proximity-based Services
Application Based Charging
Core Network Overload

Security

Security aspects of Public Warning System

Security enhancements for usage of GBA from the browser

IMS media plane security extensions

Lawful Interception in the 3GPP Rel-12

Tunnelling of UE Services over Restrictive Access Networks

Study on Security Assurance Methodology for 3GPP Network Elements

Media and Codec

Codec for Enhanced Voice Services

Coordination of Video Orientation

High Efficiency Video Coding

IMS-based Streaming and Download Delivery Enhancements

Acoustic Requirements and Test methods for IMS-based conversational speech services over LTE

MBMS Improvements

Non 3GPP access

Enhanced S2a Mobility Over trusted WLAN access to EPC (eSaMOG)
Optimized Offloading to WLAN in 3GPP-RAT Mobility
Network-provided Location information for IMS Trusted WLAN Access Network case
WLAN Network Selection for 3GPP Terminals (WLAN-NS)

OAM

Multi-vendor Plug and Play eNB connection to the network
Radio Planning Tool interface
Alarm quality improvements
OAM aspects of Network Sharing

IMS

IMS-based Telepresence
SMS submit and delivery without MSISDN in IMS
IMS Business Trunking for IP-PBX in Static Mode of Operation
SRVCC before ringing
Web Real Time Communication Access to IMS
PSAP callback
P-CSCF restoration procedures

Note: this is a non-exhaustive list

Release 13 system features

System Features

RAN Sharing Enhancements
Isolated E-UTRAN Operation for Public Safety (IOPS)
Service Requirements Maintenance for Group Communication System Enablers for LTE
Co-ordinated packet data network gateway (P-GW) change for SIPTO (CSIPTO)
Application specific Congestion control for Data Communication (ACDC)
User Plane Congestion management (UPCON)
Mission Critical Push To Talk over LTE (MCPTT)
Enhancements to WEBRTC interoperability (eWebRTCi)
Improvements to CS/PS coordination in UTRAN/GERAN Shared Networks (CSPS_Coord)
Enhancements to Proximity-based Services (eProSe)
voice over E-UTRAN Paging Policy Differentiation (voE_UTRAN_PPD)
Dedicated Core Networks (DÉCOR)
IP Flow Mobility support for S2a and S2b Interfaces (NBIFOM)

System Features

Architecture Enhancements for Service capability Exposure (AESE)
Monitoring Enhancements (MONTE)
Group based Enhancements (GROUPE)
Enhanced CS Fallback (eCSFB)
Double Resource Reuse for Multiple Media Sessions (DRuMS)

Security /Codec / OAM

Lawful Interception in the 3GPP Rel-13 (LI13)
End-to-End Multimedia Telephony Service for IMS extensions
Video enhancements by Region-Of-Interest information signalling (ROI)
Enhanced Network Management centralized Coverage and Capacity Optimization
Study on Compliance of 3GPP SA5 specifications to the NGMN NGCOR
Study on Enhancements of OAM aspects of Distributed Mobility Load Balancing SON function
Study on Application and Partitioning of Itf-N
Study on Network Management of Virtualized Networks U

Note: this is a non-exhaustive list

Key trends for system standards development

Stability, Capacity

Ensuring system stability, expanding capacity

Growth

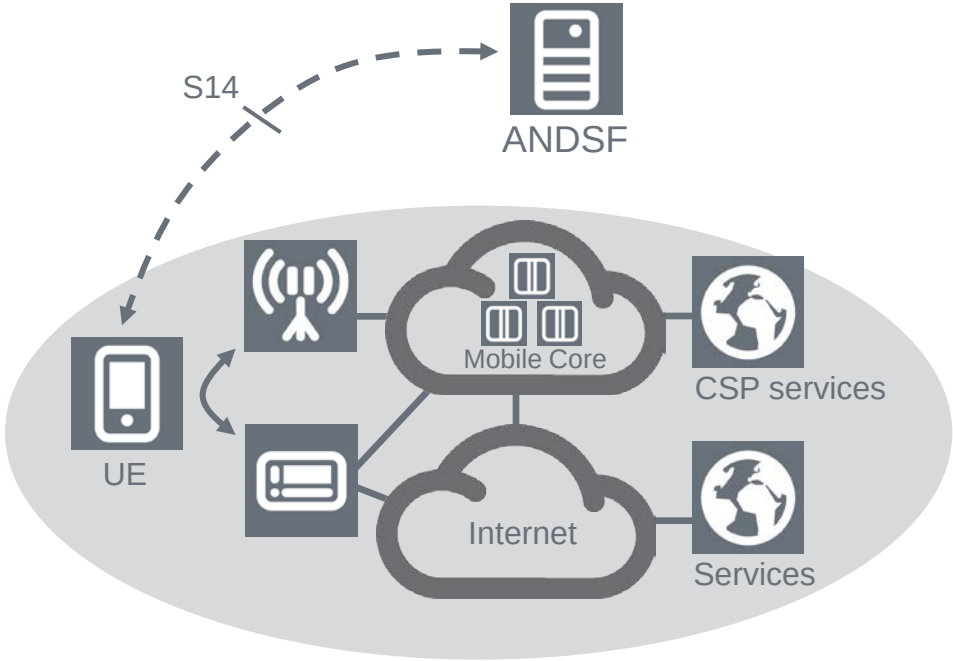
Opening LTE towards new business opportunities and segments

Stability, Capacity

Offloading to WiFi

Access Network Discovery and Selection (ANDSF)

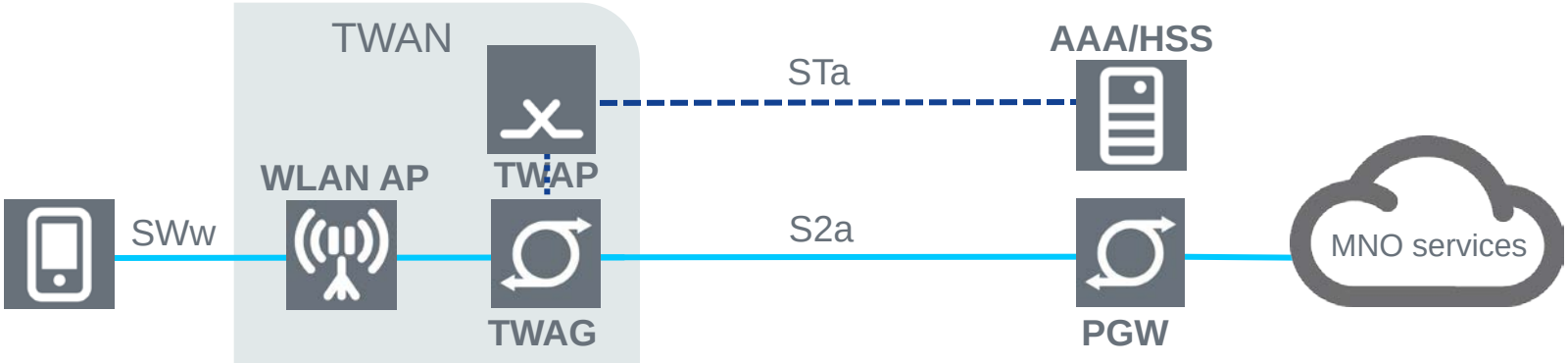
- The ANDSF provides network discovery information and access network selection policies to the UE
- Device Management framework from the Open Mobile Alliance (OMA) is re-used for this purpose



ANDSF enables the operator to influence WiFi network usage

Tight integration of WiFi

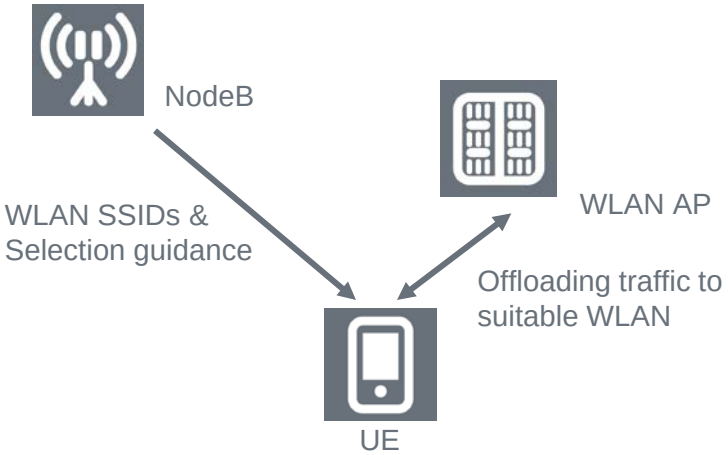
WiFi as trusted access



- Based on the subscriber data received during WiFi access authentication a PDN connection is created to the EPC (PDN GW)
- This is done in a seamless manner, i.e. transparent to the UE
- Seamless mobility with cellular access and multiple connections are supported
- ANDSF policies for selecting between WLAN NWs and APs

Even tighter integration of WiFi

RAN level integration

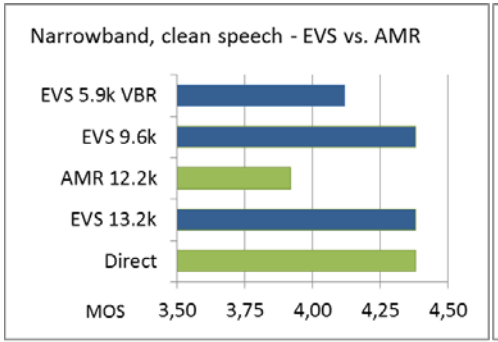


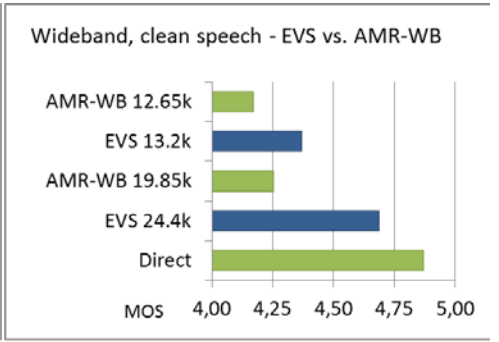
- RAN will provide
  - Parameters about offloading priority (e.g. based on RAN load)
  - “RAN rules” about WLAN offloading
  - WLAN selection information
- Enhance ANDSF rules with RAN parameters

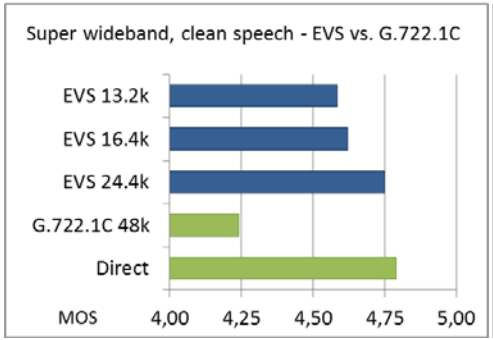
Growth

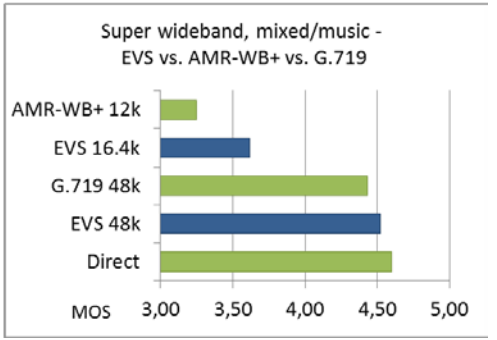
VoLTE developments – EVS codec

- EVS is the first SuperWideBand codec designed to provide superior voice quality
  - Significantly enhanced quality and coding efficiency for narrowband (NB) and wideband (WB)
  - Further quality enhancement by introducing super wideband (SWB) and fullband (FB)
  - Unmatched mixed/music performance in conversational codecs across the bit rate range
  - Greatly improved frame error resilience









Critical Communications

June 2012

First Work Item created to enable LTE for Public Safety

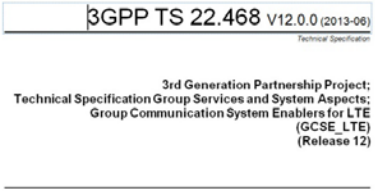
Broad support, rapid start to the work

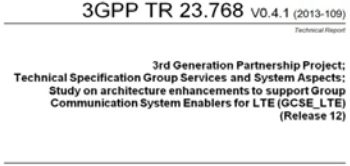
December 2012

3GPP SA#58 selected key priorities for Release-12

Public Safety selected as **key strategic area** for Rel-12.

Today





First set of features for Public Safety close to **completion in Rel-12**

Rel-13 work well underway

3GPP decided to commit to application standards for Public Safety

Introducing CriticalComms specific features

3GPP Rel-12

Group Communication (GCSE)

- Leverage commercial LTE Broadcast (eMBMS) to allow a user to communicate with a group of other users.
- Includes a model for switching between unicast and broadcast bearers

Proximity Services (ProSe)

- One-to-many direct device-to-device communication
- Device can be in or out of LTE coverage

3GPP Rel-13

Mission Critical Push To Talk

- Two or more users may engage in voice communication supporting mission critical scenarios

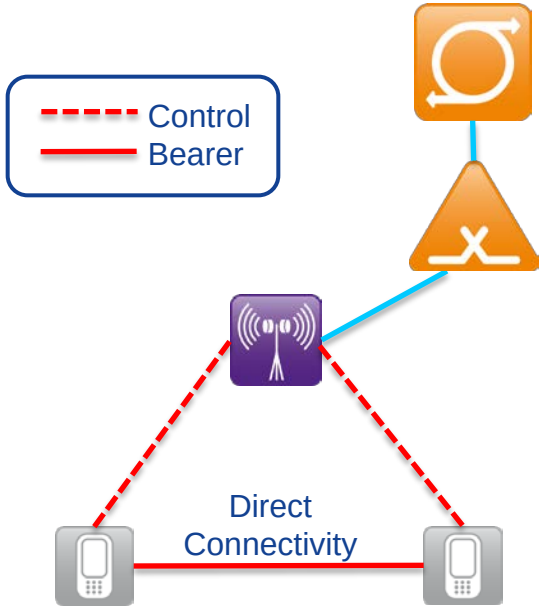
Enhancements of ProSe and GCSE

Isolated E-UTRAN Operation

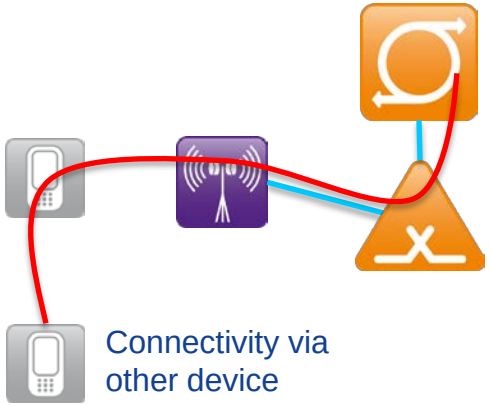
- Resilience to loss/lack of backhaul through local routing

Proximity Services (ProSe)

ProSe Discovery
Both with and without Network Assistance



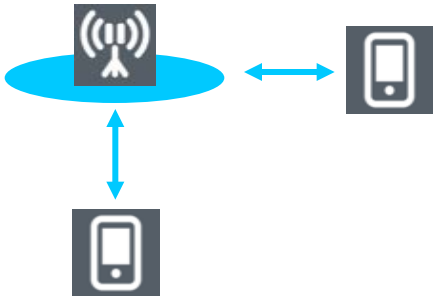
ProSe Communication
Both with and without Network Control



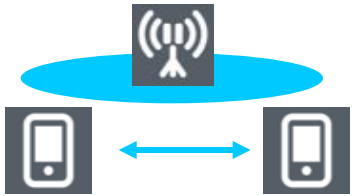
ProSe Relay
Device to Network Relay

Proximity Services (ProSe) - Discovery

Discovery via the operator network



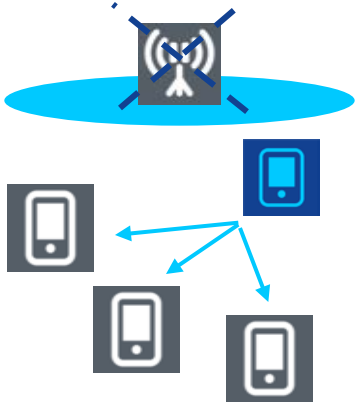
Discovery via the direct radio links



- Devices are able to discover other devices by using direct radio links or via the operator network (intra-/inter-cell).
  - In Release 12 both discovery options supported in network coverage scenarios only.
- Always-on type of operation
  - Not necessarily related to ongoing or upcoming data communications between the devices.
- Open and restricted (i.e. explicit permission from the ProSe-enabled device being discovered) discovery.
- Potentially large numbers of concurrently participating ProSe-enabled devices are supported

Proximity Services (ProSe) - Communication

One-to-many broadcast even in the absence of infrastructure.



- Broadcast communications in physical layer (i.e. no feedback loop) and is connectionless
- Works in complete absence of infrastructure as well.
- The direct user plane communication service for transmission of IP packets is provided by the radio layer
- Group security keys are derived from a shared secret to encrypt all user data for that group
- Communications between two devices does not depend on a separate link, e.g. to eNB
- Users are able to operate independently of network
- Final group/user identification done on higher layers

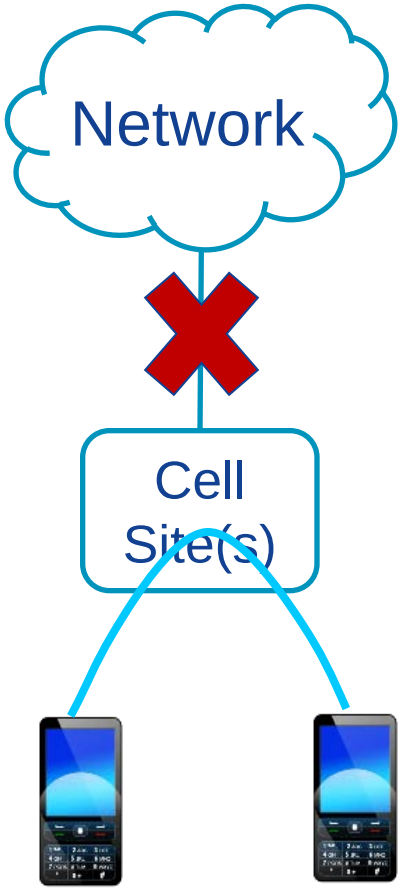
Group Communication (GCSE)

Group Communication over LTE

- Broadcast mode of eMBMS for one to many communication
- Normal EPS bearer for Unicast Communication
- Session Continuity for PtP/PtM switching
- Use of Proximity Service for off network based group communication

Isolated E-UTRAN Operation

- Resilience to loss/lack of backhaul for Critical Communications
- Supports locally routed communication in LTE
  - for “nomadic” eNodeBs operating without backhaul connectivity
  - for “regular” eNodeBs experiencing temporary loss of backhaul connectivity

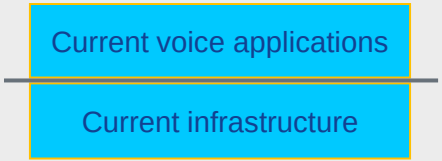


Mission Critical Push to Talk (MCPTT)

- Several Standards Development Organizations were working in the MCPTT space
- In August a joint decision was taken to focus all MCPTT work into 3GPP
- Application layer to maintain groups, join/leave groups, floor control, pre-emption, security, etc.
- Types of calls
  - “Regular” group call
  - Broadcast group call, e.g. user broadcast: no response expected by initiating user
  - Group call based on priorities, e.g. emergency group call: high priority group call that could pre-empt other in-progress calls
  - Private calls: one-to-one calls
- Interworking with legacy Public Safety systems (P25 & TETRA) will be addressed

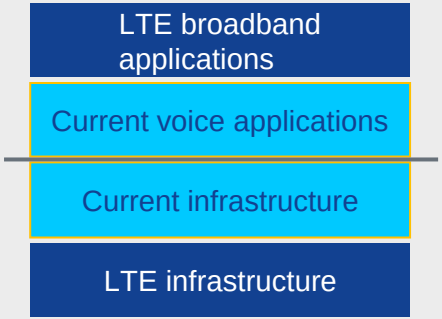
Technology migration for CriticalComms

Today



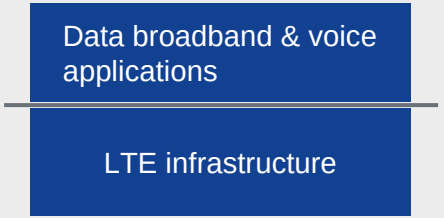
- Tetra/P25 based networks installed
- Applications focused on voice (group calls, push-to-talk)

Short-term



- New LTE infrastructure for new broadband data applications
- Tetra/P25 further evolving for voice using robust user phones

Target



- LTE infrastructure for all services
- One applications infrastructure for all services
- LTE based devices for all applications

Product Security (SECAM)

Goal: create methodology to globally harmonize 3GPP product assurance

Creates Security Assurance Specifications (SAS)

Accredits all actors and manages the dispute process

Process

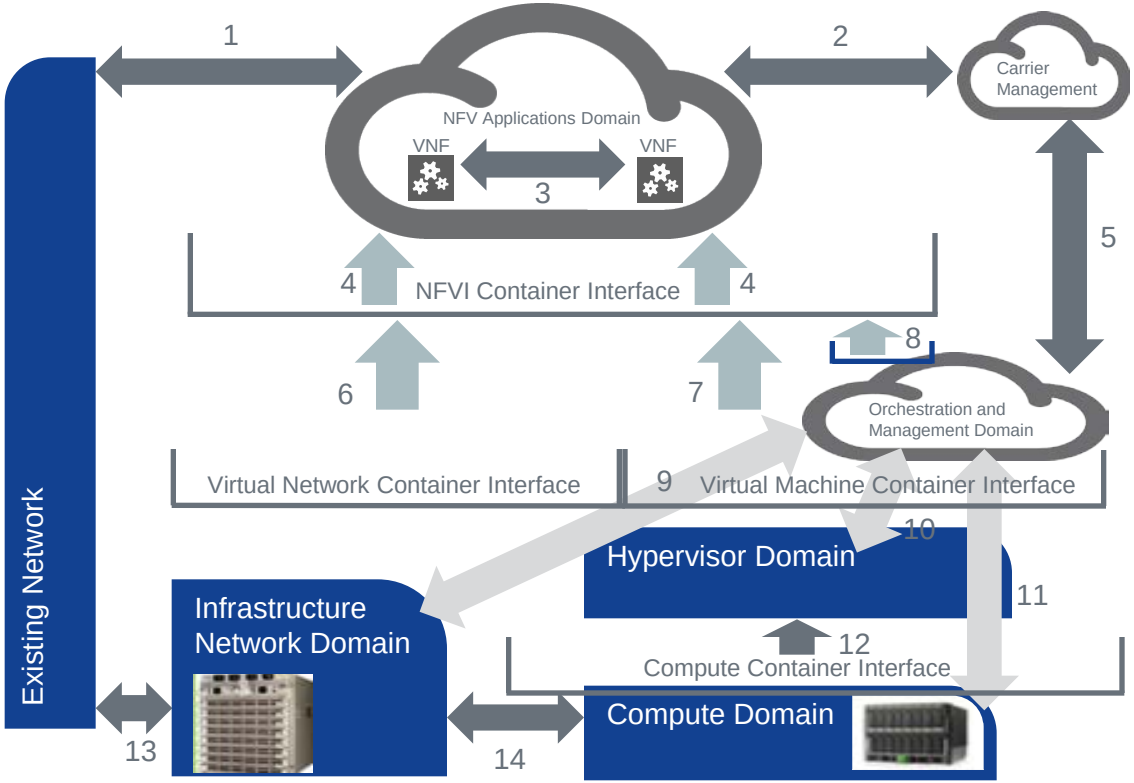
- Evaluation of product implementation against SAS done by accredited labs
  - SAS contains security requirements with the associated test cases and hardening requirements
  - Vendor may perform such evaluation if the vendor is accredited
- All the output documents are given to the operator for its final review and decision
- The vendor's general development process is assessed during vendor accreditation

Architecture trends

Network Function Virtualization (NFV)

Main components:

- Decouple software functions from the resources
- Enhance level of automation
- Fast service introduction
- Service and network performance analysis and optimization



NFV in ETSI – Phase-1

Carrier-led Industry Specification Group (ISG):

Operators: 33

Members: 226+

Mode of Operation:
Operates by consensus

Plenary ISG level,4 Working Groups, 2 Expert Groups, NOC and TSC

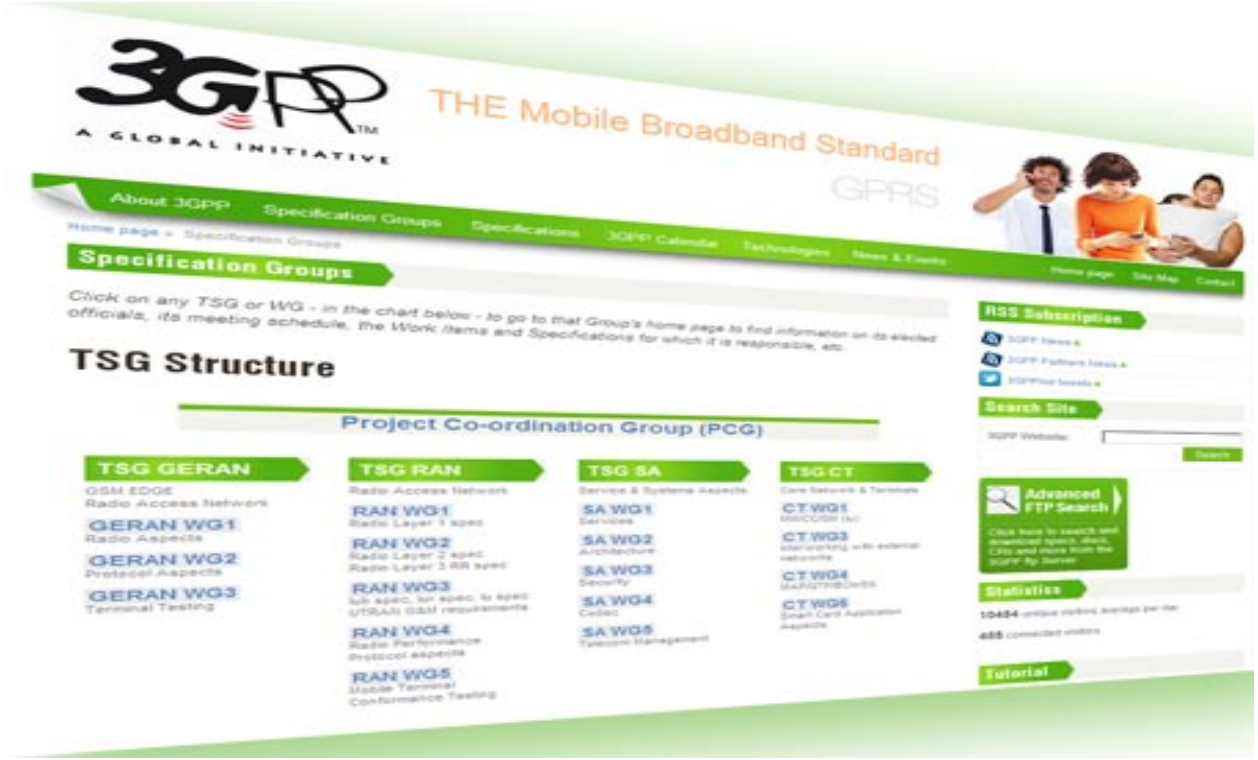
Scope:
Pre-standardization: White papers addressing challenges and operators requirements, use cases, architecture framework, as input to standardization bodies.

Accomplishments:
- Published 4 framework documents - Use Cases, Requirements, E2E Architecture and Terminology
- 18 PoC demonstrations approved - interoperability demonstrations of the NFV concepts.
- Working Groups stable drafts

NFV in ETSI – Phase-2

- Main theme: ensure interoperability, building on the success of phase-1
- Additional two years to the lifetime of ETSI NFV (from Feb 2015 until Jan 2017)
- Phase 2 will contain both **normative** and **informative** work
- Focus Areas
  - Management and Orchestration
  - Interface/API between Infrastructure and Virtualised Network Functions (a.k.a. SW appliances)
  - Security issues arising inherently from virtualisation
  - Applying SDN in context of NFV
- 3GPP work…
  - …started on Management and Orchestration aspects
  - Potential future work on core architecture aspects

Thank You!



www.3gpp.org