5G Framework for automated network adaptation in Mission Critical Services

November 27th , 2018

Elisa Jimeno
Atos Research and Innovation
Telecom Sector

Your business technologists. **Powering progress**

Outline

- ➤ Introduction
  - ➤ Background
    - ➤ Problem
      - ➤ Solution
        - ➤ Evaluation
          - ➤ Conclusion
            - ➤ Questions

AtoS

What we do

Creating business advantages for clients with our global IT services

Atos is a leading player in global Information and Communications Technology services, software, platforms and payments solutions. With its deep technology expertise, Atos drives business progress for its clients to achieve measurable results.

Bull atos technologies   **worldline** e-payment services   **canopy** the atos cloud   **bluekiwi** An Atos Company   **Atos** Consulting   **Atos** Worldgrid   **UNIFY**

Managed Services

Transactional & Payment Services

Consulting

Cloud & Enterprise Software

Systems Integration

Big Data & Security

Communication Software & Platforms

10,000
UK & Ireland
United Kingdom, Ireland

8,000
Benelux & The Nordics
Belgium, Denmark, Estonia, Finland,
Luxembourg, Sweden, The Netherlands

6,500
Iberia
Andorra, Portugal,
Spain

13,000
Central & Eastern Europe
Austria, Bulgaria, Croatia, Cyprus,
Czech Republic, Greece, Hungary, Italy,
Lithuania, Poland, Romania, Russia,
Serbia, Slovakia, Switzerland, Turkey

16,500
France

12,000
Germany

9,000
North
American
Operations

6,000
Asia Pacific
Australia, China, Hong Kong,
Indonesia, Japan, Malaysia,
New Zealand, Philippines,
Singapore, Taiwan, Thailand

4,000
South America
Argentina, Brazil, Chile,
Colombia, Uruguay

15,000
India, Middle East
& Africa

Headcount as of February 2016

Atos | Worldwide IT Partner

BACKGROUND

Mission Critical Services in 5G

- Today, Public Safety operate with push-to-talk communications for coordinating emergency situations

- Current Land Mobile Radio systems
    - Narrowband channels
    - Interoperabilty between devices
    - High operational and maintenance

- MCS are gaining interest among network operators

- 5G will provide more powerfull application services

5

AtoS

NFV as a enabler for Public Safety

- Voice communication service that allocates the user plane at the edge, keeping the control plane centralised for synchronization and assistance purposes

- MCPTT application for First Responders already specified in the 3GPP release 11

- Coordination of emergency teams by featuring:
  - Group calls: one-to-many
  - Private calls: one-to-one manner
  - Emergency calls: pre-emptive call

AtoS

PROBLEM

Challenges to solve

- Transparent and elastic allocation of virtual and physical resources

- Traffic priorisation based on service conditions
  - Default service agreement
  - Incident capacity extension
  - Damage infrastructure coverage extension

- Configuration of logical networks to provide specific network capabilities (slices)

AtoS

SOLUTION

5G-ESSENCE Architecture

Edge Cloud Computing exploiting the benefits of the centralization of Small Cells functions to be offered as a Service

Two tier architecture:

- Main DC

- Ligth DC (CESC)
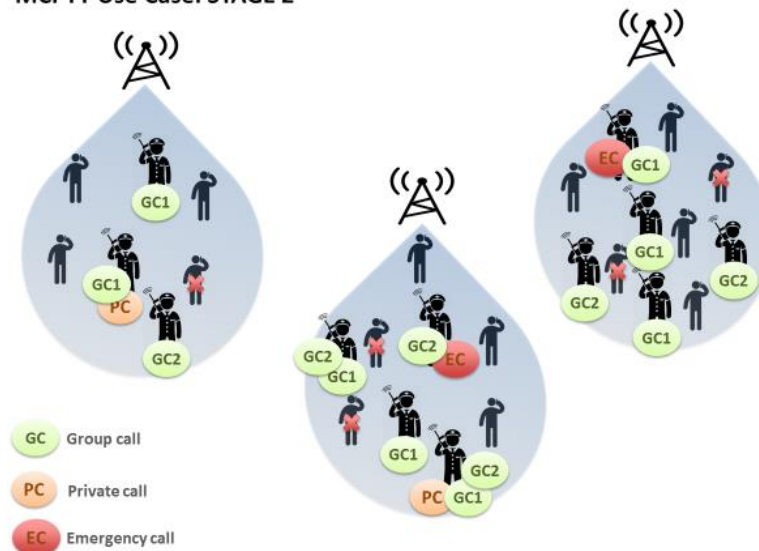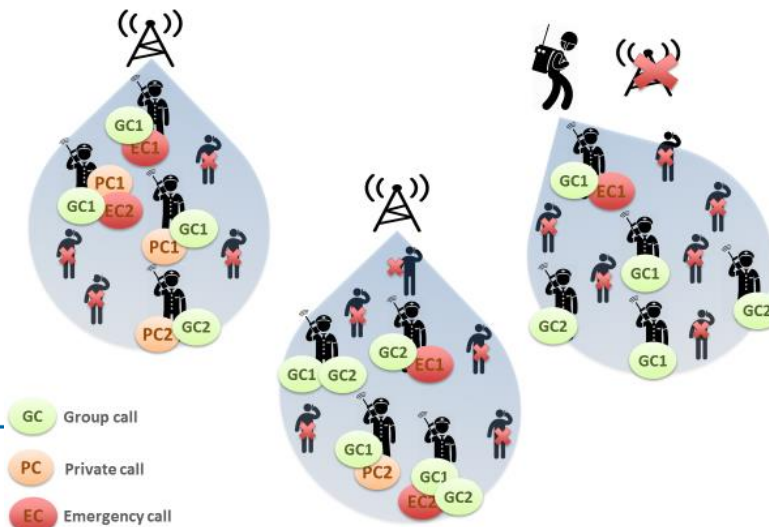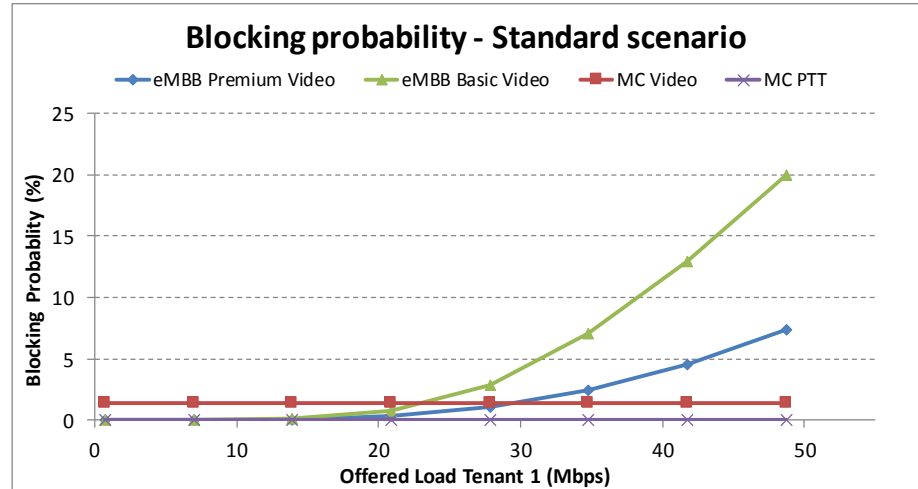 - RATs

cSD-RAN
  - RRM and SON
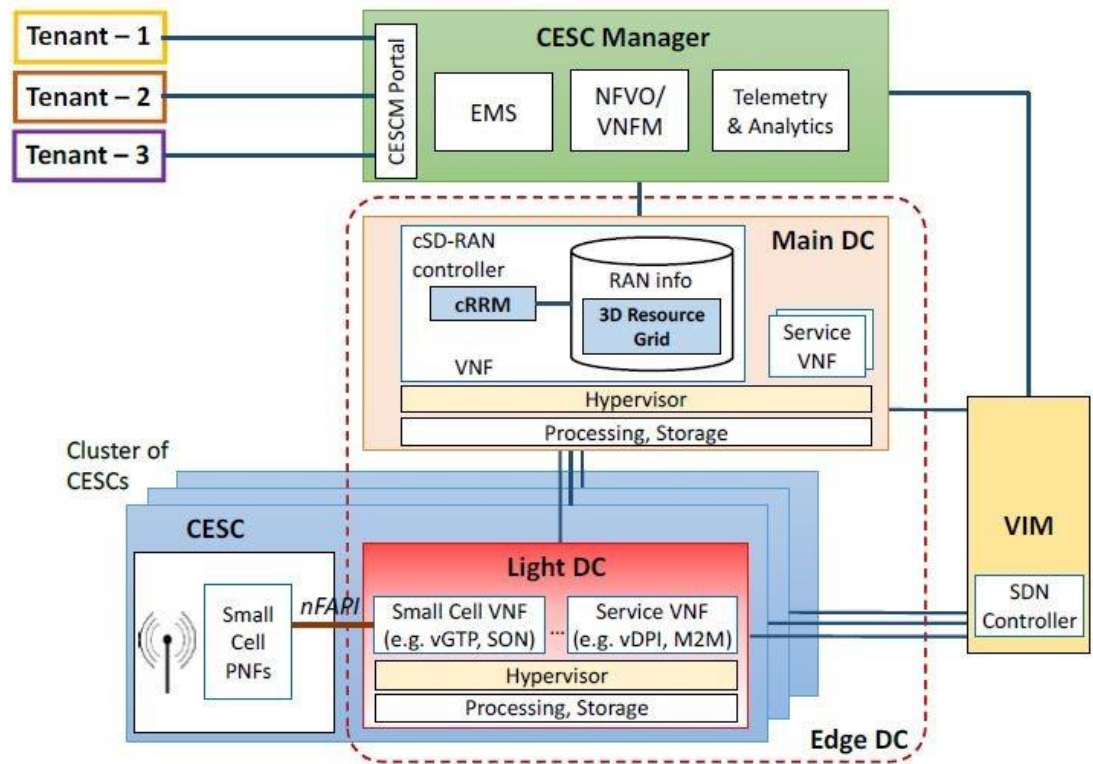
Scenario
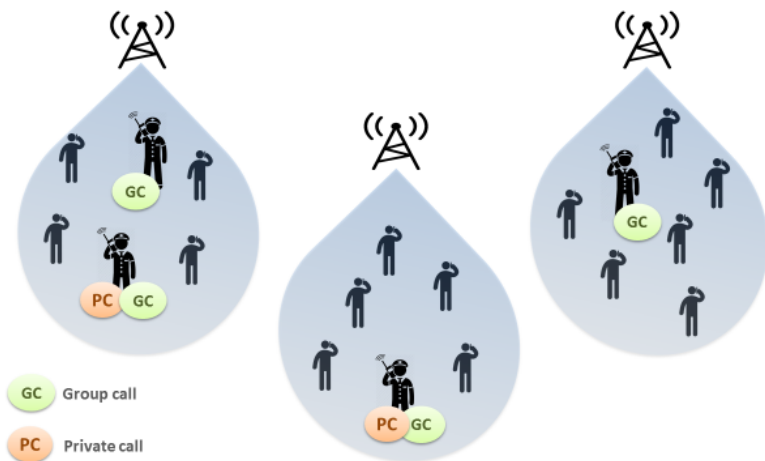
Operational support

- OSM - MANO Orchestrator of services

- OpenStack - VIM
  - Service placement
  - Dynamic adition of deployable CESCs

- Prometheus – Monitoring system
  - Service environment context
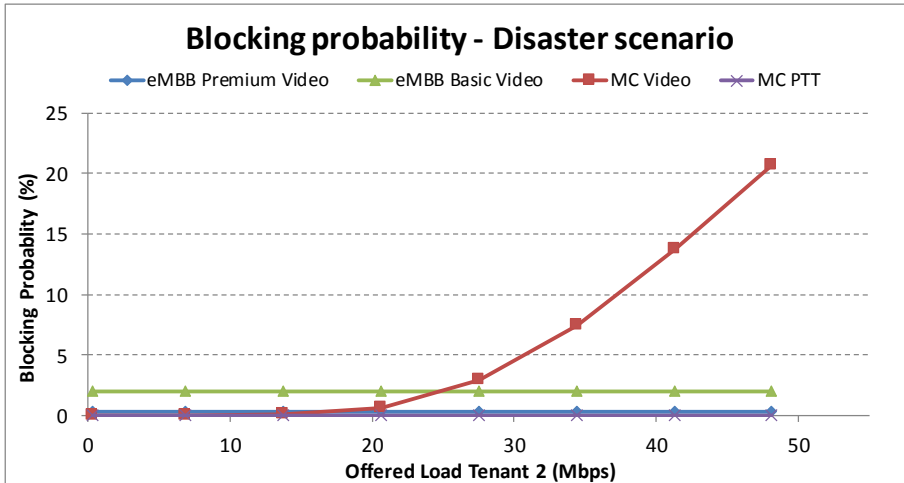 - Alerting/Problem identification
  - SLA management

AtoS

EVALUATION

First Results

Slice/Tenant	Service	ARP	GBR
1. Commercial operator	Premium- Video HD	2	10Mb/s
	Basic Video	3	3Mb/s
2. Public Safety operator	MC Video	2	5Mb/s
	MCPTT	1	48kb/s

Blocking probability - Standard scenario

eMBB Premium Video   eMBB Basic Video   MC Video   MC PTT

Offered Load Tenant 1 (Mbps)

Blocking Probability (%)

Blocking probability - Disaster scenario

eMBB Premium Video   eMBB Basic Video   MC Video   MC PTT

Offered Load Tenant 2 (Mbps)

Blocking Probability (%)

60% for slice 1

20% for slice 2

30% for slice 1

50% for slice 2

- Blocking probability

- Isolation between slices

AtoS

CONCLUSIONS

Conclusions

- Cloud-RAN in 5G architecture makes viable the extension of services near the end-user

- It reduce network latency and KPIs for a better QoS in critical communications

- Improvement of network usage by automatic configuration of resource allocation

AtoS

Future work

- Localization of users based on monitoring information

- SDN controller for management of data flows

- Final validation in BAPCO event

    …. on going collaboration:

Elisa Jimeno

Begoña Blanco
Aitor Sanchoyerto

Jordi Pérez-Romero
Irene Vilà Muñoz

Javier Fernández

References

- 5G ESSENCE www.5g-essence-h2020.eu

- 3GPP TS 22.179 v16.1.0, Mission Critical Push to Talk (MCPTT) over LTE; Stage 1 (Release 14), April, 2018.

- 3GPP TS 23.501 v15.2.0 "System Architecture for the 5G System; Stage 2 (Release 15)", June, 2018.

- 3GPP TS 38.300 v15.2.0, "NR and NG-RAN Overall Description; Stage 2 (Release 15)", June, 2018.

- Prometheus - Monitoring system & time series database

- OSM Release FOUR Technical Overview

- OpenStack: The Path to Cloud

AtoS

THANK YOU FOR YOUR ATTENTION

Questions?

Elisa Jimeno

Atos Research and Innovation –Telecom sector

Elisa.Jimeno@atos.net