
AIR-LYNX
Electro Rent
EUROPE
An Electro Rent Global Company
AIR-LYNX
WHERE NO LTE HAS GONE BEFORE
07 MARCH 2018
FHI FEDERATIE VAN TECHNOLOGIEBRANCHES
TELECOM INFRA EVENT 2018
07-03-2018
DE KUIP ROTTERDAM
4G/5G VIRTUAL RAN IN RAILWAY ENVIRONMENT
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AIR-LYNX

4G LTE MANUFACTURER FOR PROFESSIONAL APPLICATIONS

COMPANY

Creation : 2013

Employees : 25 (20 Engineers)

Offices: 800 m² LES ULIS France

Origin of products : France

CUSTOMERS

NAVAL GROUP, DGA,

HONEYWELL, HYTERA, SELEX,

SNCF, THALES, FUNKWERK

Revenue 2016 : 2,1 M€

MEMBERSHIP

bpifrance

La FRENCH

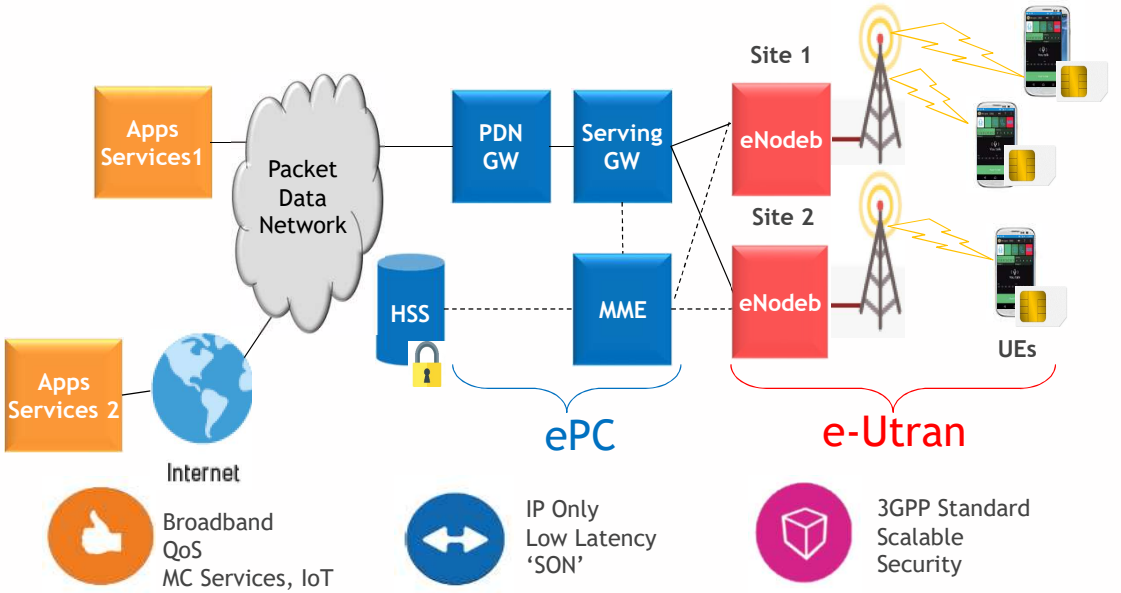
BUSINESSFRANCE

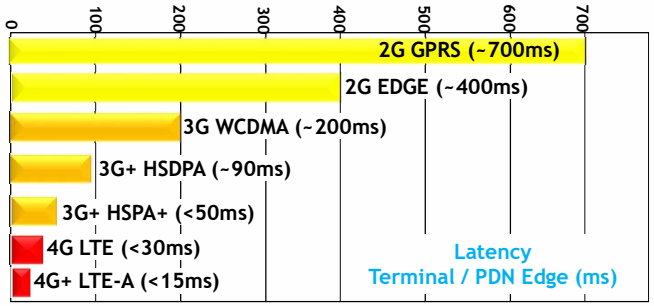
scientipôle initiative

91 D'OR

AIR-LYNX

4G LTE IN 1 SLIDE





Simplified architecture

- Reduced & efficient functions
- IP convergence
- Scalability & modularity

Enhanced performances

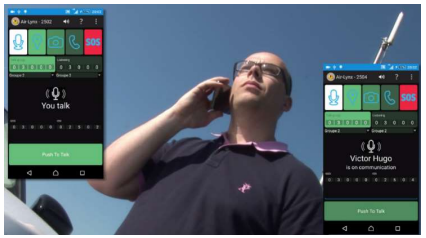
- Reduced latency, enhanced throughput
- Quality of Service
- Security

4G Standard

- 3GPP worldwide standard & ecosystem
- Support of MC services, NB-IoT, …
- For Private and Commercial Networks

eUTRAN: Evolved Universal Terrestrial Radio Access Network
ePC: enhanced Packet Core
MME: Mobility Management Entity
HSS: Home Subscriber Server

4G LTE FOR RAILWAYS TRANSPORTATION
HIGH SPEED TRAIN / GROUND TRANSMISSIONS



LTE at high speed:

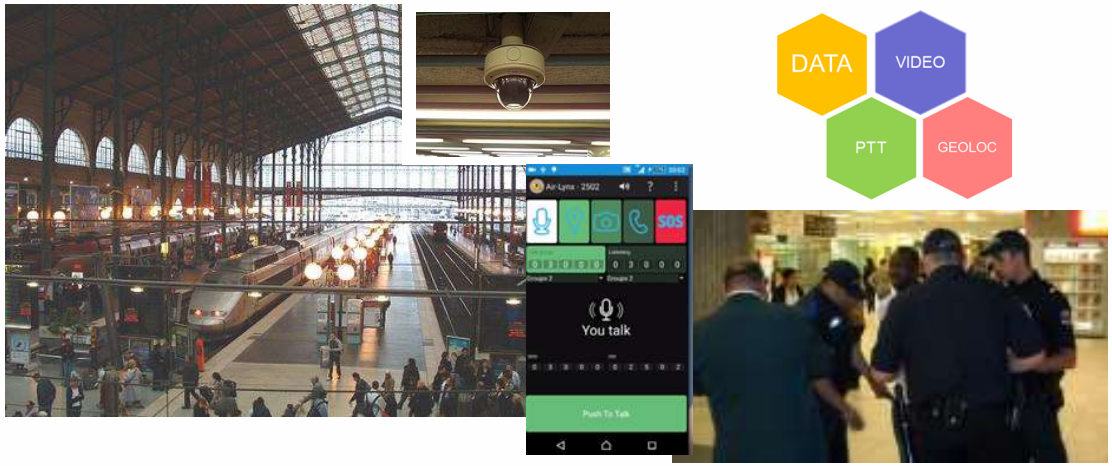
- Test with sites at 10km, modems on train
- Hand over and doppler effect managed
- Communications Driver <-> Station(s)

- Communications Train <-> Station
  - Train Driver <-> Team in Station
  - Video on station sent to driver
  - IoT support (NB-IoT, LTE-1M)
  - 3GPP FRMCS* (with UIC) started

FRMCS* (Future Railways Mobile Communication System)
UIC (Union Internationale des Chemins de fer/ International Union Railways)

4G LTE FOR RAILWAYS TRANSPORTATION

DENSE AREAS SECURITY AND MAINTENANCE



Enhanced data with mobility:

- MC Voice PTT and Broadband Data
- Sharing of real time video, access CCTV
- Emergency call
- Existing TETRA Network interworking

On tracks enhanced maintenance:

- Catenary & infrastructure inspections
- Assistance during tracks placing
- Repair geolocation management

EMERGENCY AND HUGE EVENT

Huge event coverage: (Euro 2016)

- Modular and simple extensions of system
- Interoperability voice / data with LMR
- Interoperability with home office, firemen
- Huger teams (possibility Mcast)

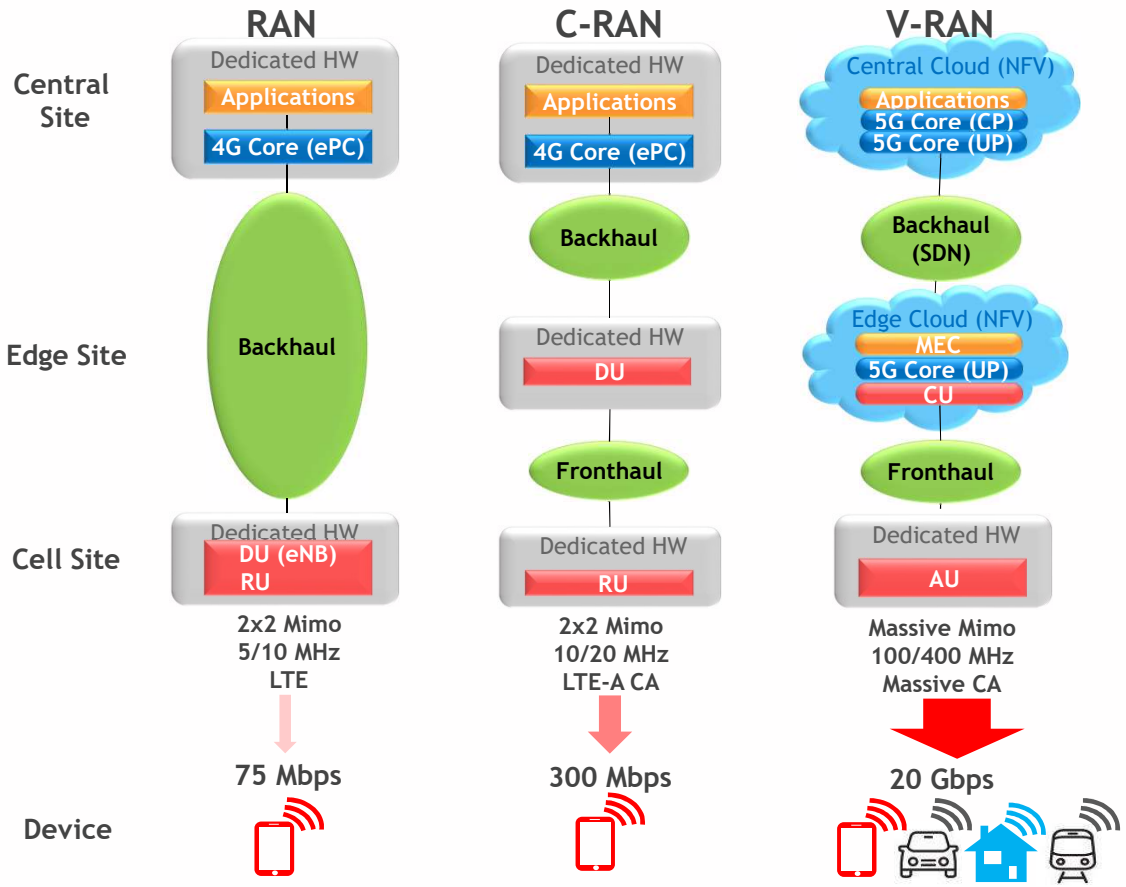
Critical situation coverage:

- NRBC* attack or Bombing situations
- Quick installation (less than 30mn)
- 'All-in-One' Transportable infrastructure
- Inter-communication with Home Office

NRBC*: Nuclear, Radiologic, Biologic, Chemical

V-RAN FOR RAILWAYS TRANSPORTATION

RAN/C-RAN/V-RAN



4G RAN as « LTE » RAN (e-UTRAN)

4G+ C-RAN as « Centralized-RAN »

- Split eNB: DU / Fronthaul / RU
- DU Pool

5G V-RAN as « Virtualized-RAN»

- NFV /SDN Model
- Central/Edge Cloud

DU: Digital Unit (BBU)
CU: Central Unit
MEC: Mobile Edge Computing
SDN: Software Defined Networking
RU: Radio Unit (RH)
AU: Access Unit (RH + %PHY)
NFV: Network Functions Virtualization

V-RAN ADVANTAGES

- Reduced Capex/Opex
  - More & mixed RHs (Macro/SmallCells)
  - Reduced sites cost (m2, energy, access)
  - Controlled and reduced energy
  - Upgrade / Configuration simplified

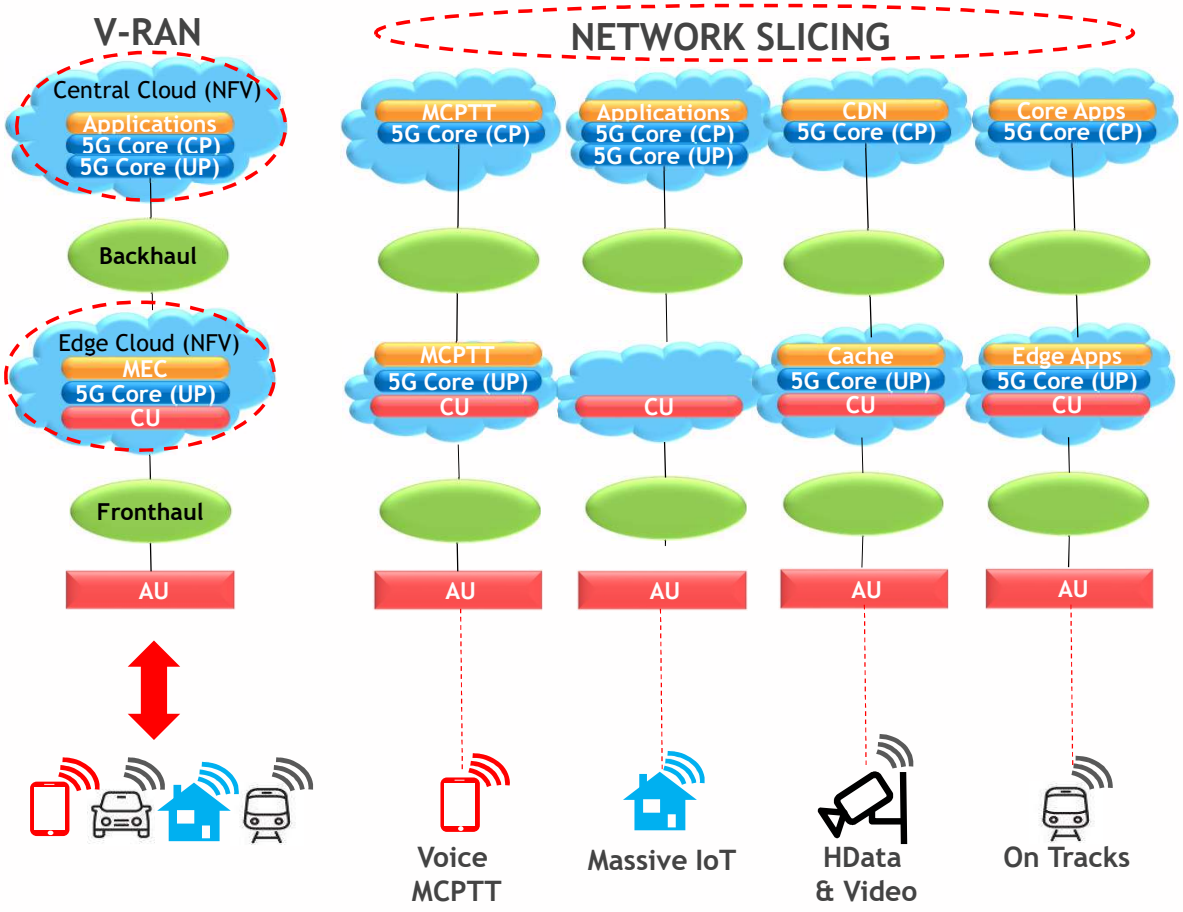
- 'Natural' evolution path 4G ➔ 5G
  - Similar 4G/5G RAN stacks
  - Software predominance (SDR, SDN, NFV)
  - Unified transport (GEth / Fiber)

- Reduced Interferences
  - More RHs and frequency bands
  - More Carrier Aggregation
  - Massive MIMO, BeamForming
  - Better radio coordination (DU Pools)

- Enhanced Timing & Features
  - Enhanced transport & NR scheduling
  - Mission Critical support
  - Slicing, Edge Computing
  - Pooling & Cloud computing

SDR: Software Defined
SDN: Software Defined Networking
NFV: Network Functions Virtualization

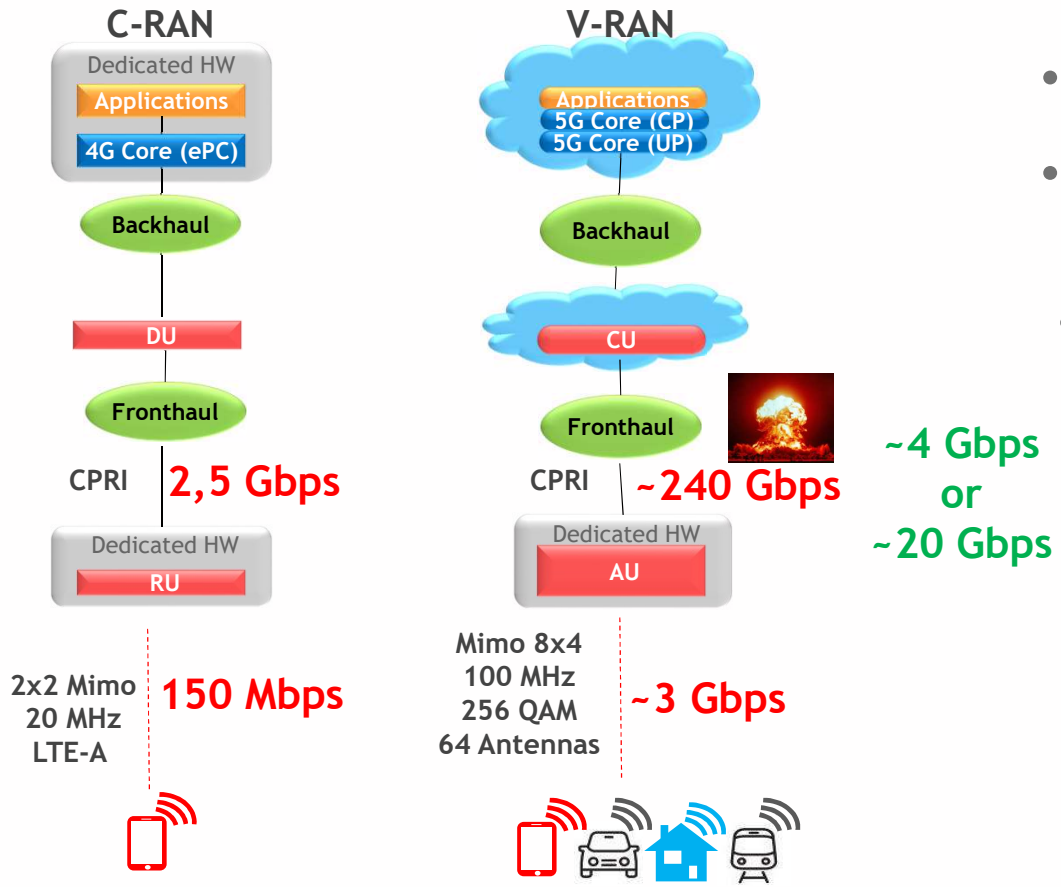
V-RAN APPLICATIONS



- EDGE CLOUD model
  - Per Station: optimized for throughput
  - Per Line/Tracks: optimized for radio
- CENTRAL CLOUD model
  - Aggregation / Central applications
  - Global management of network
- SLICING usage:
  - 1 SLICE per usage: IOT, MCPTT, Stations, Train, UAV, …
  - Optimization of use cases

CDN: content delivery network
MCPTT: Mission Critical Push To Talk

V-RAN PARADIGM



- \+ More throughput, Edge DU, Radio site RU
- \- Fronthaul (CPRI) throughput explosion

- Solution (under study & Definition):
  - Evolution transport (from CPRI)
  - Split 'intra PHY layer' (within AU)
  - eCPRi V1, xRan Forum, Transport Infra Project…and 3GPP

CPRI: Common Public Radio Interface
I&Q: In-Phase & Quadrature


AIR-LYNX
THANK YOU.
ANY QUESTION?
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