3GPP
A GLOBAL INITIATIVE

LTE Standards for Public Safety – 3GPP view

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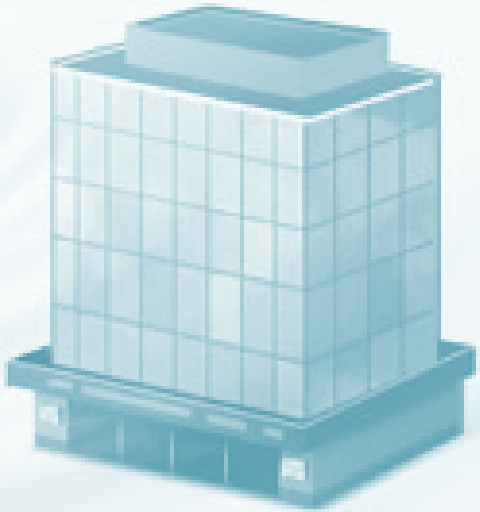
Introduction

- Standards used for commercial cellular and critical communications have historically been separate
- New interest today in adapting LTE for critical communication and public safety applications
- 3GPP is working in collaboration with the critical communication industry to deliver standards



Commercial cellular

Benefits of vast success:

- Huge R&D investment and innovation
- Economy of scale
- High speed, multimedia
- Network capacity

But:

- Not optimized for critical communications
- (Generally) no strong coverage obligations

Critical communications

Features:

- Robust
- Excellent group operation
- Priority control
- Direct mode

But:

- Expensive due to limited volume
- Slower evolution than commercial cellular

Etc,…

Commitment to LTE

National Public Safety Telecommunications Council

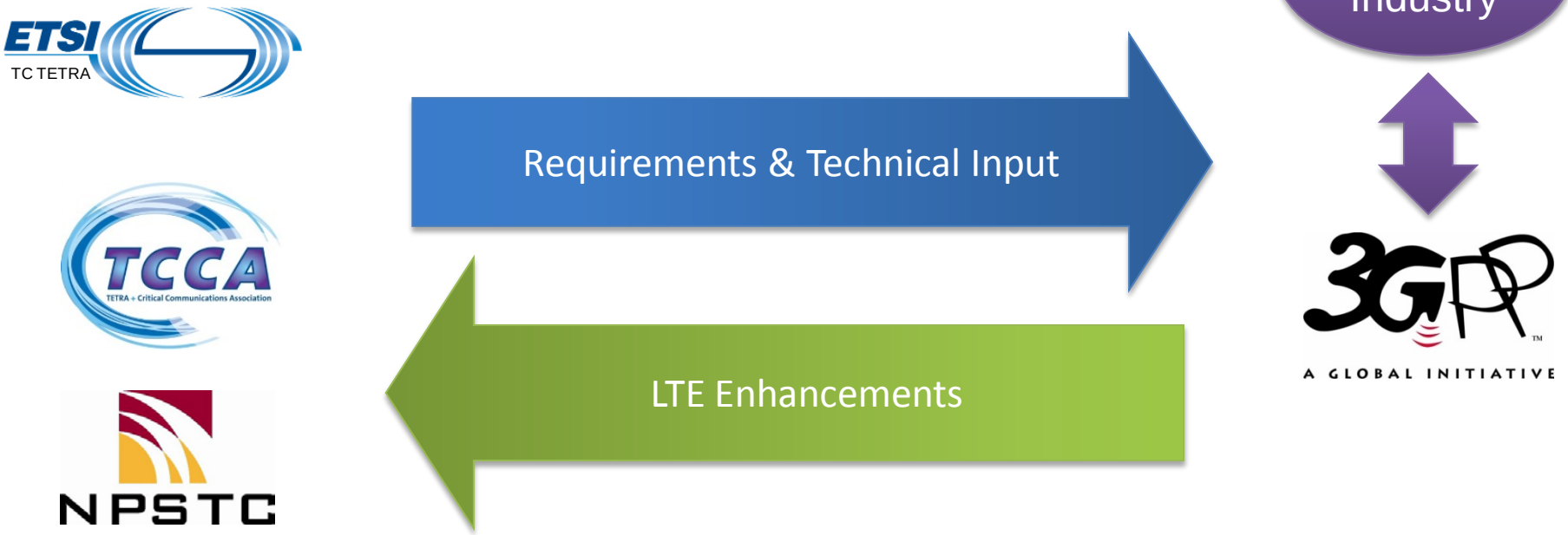
- Spectrum and US$7bn funding for LTE-based national US public safety network at 700MHz
- Started standards process in 3GPP

Tetra + Critical Communications Association

- Committed to LTE for broadband critical communication systems

3GPP Cooperation

- Preserve strengths of LTE while also adding features needed for public safety
- Maximise the technical commonality between commercial and public safety aspects



Striking a balance – the sliding scale

Less customization

More customization

More COTS technology reuse

Lower costs

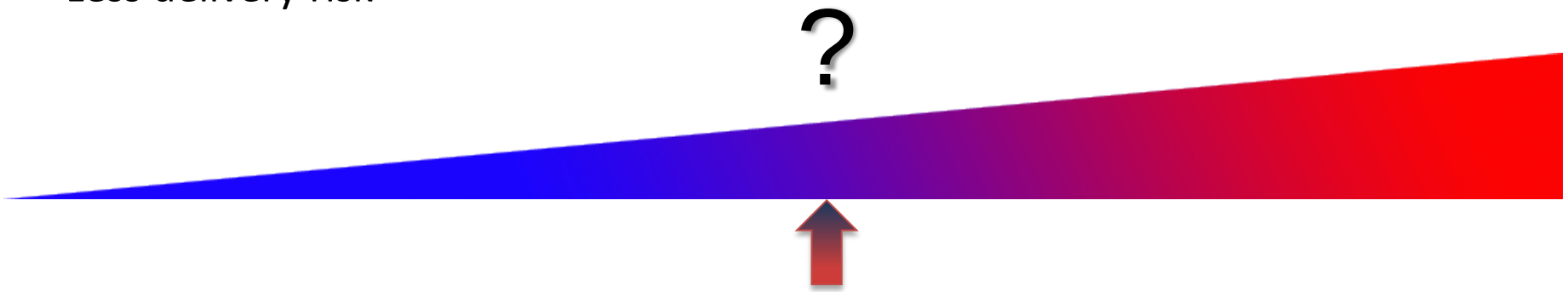
Faster standardization

Less delivery risk

More operating modes supported

Performance (KPI) improvements

Better support for “difficult” radio situations



Public safety scope in 3GPP

System Features

Proximity services (ProSE)

Group call on LTE enablers (GCSE_LTE)

Radio Layer Features

Frequency band support

Power level support

Radio enablers for system features

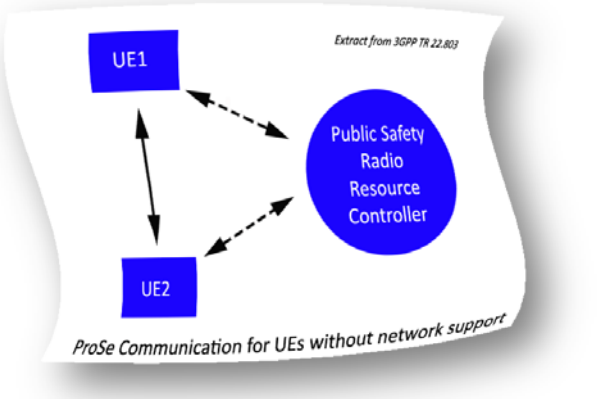
Proximity services objectives

Allow devices in close proximity to communicate directly

- Reduce network load
- Increase capacity in given bandwidth
- Allow communication in areas without network coverage

Also interest for consumer applications

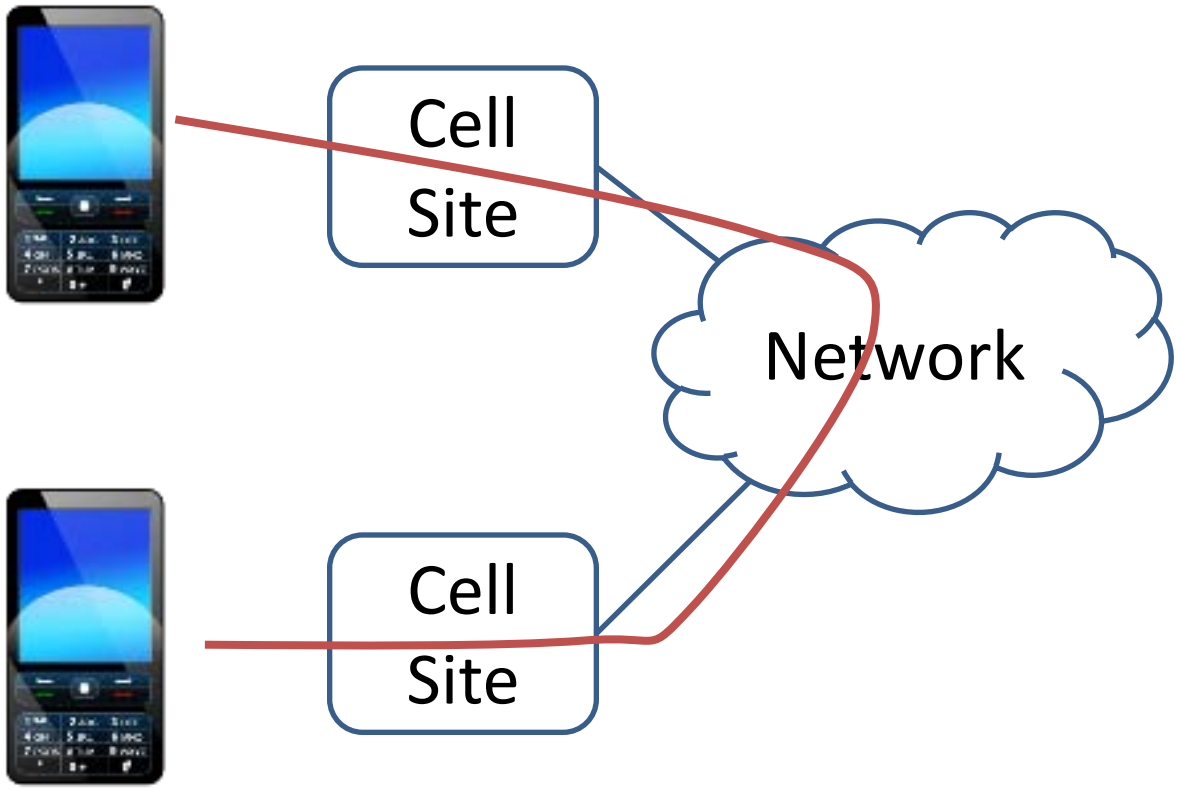
Public safety only



From 3GPP TR 22.803

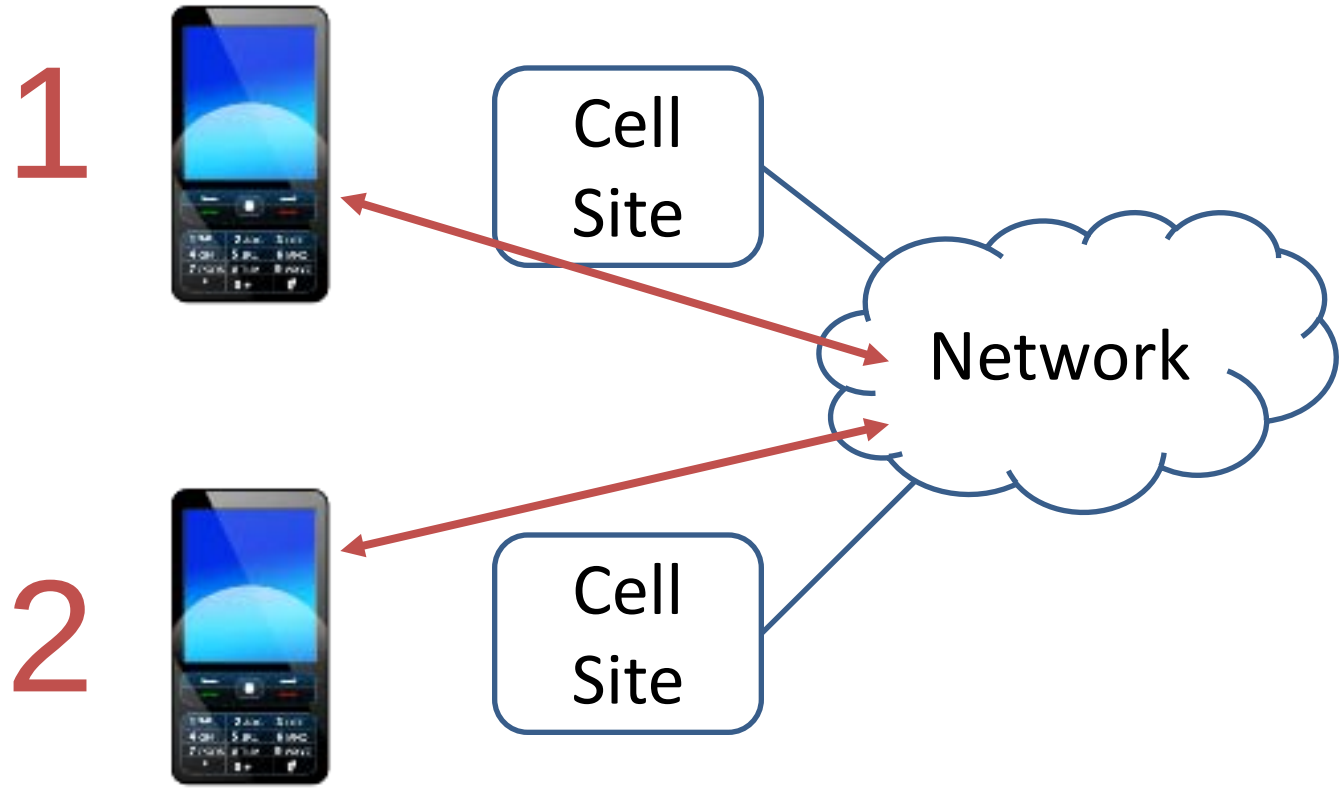
Proximity services (ProSE)

Current LTE Communication Path



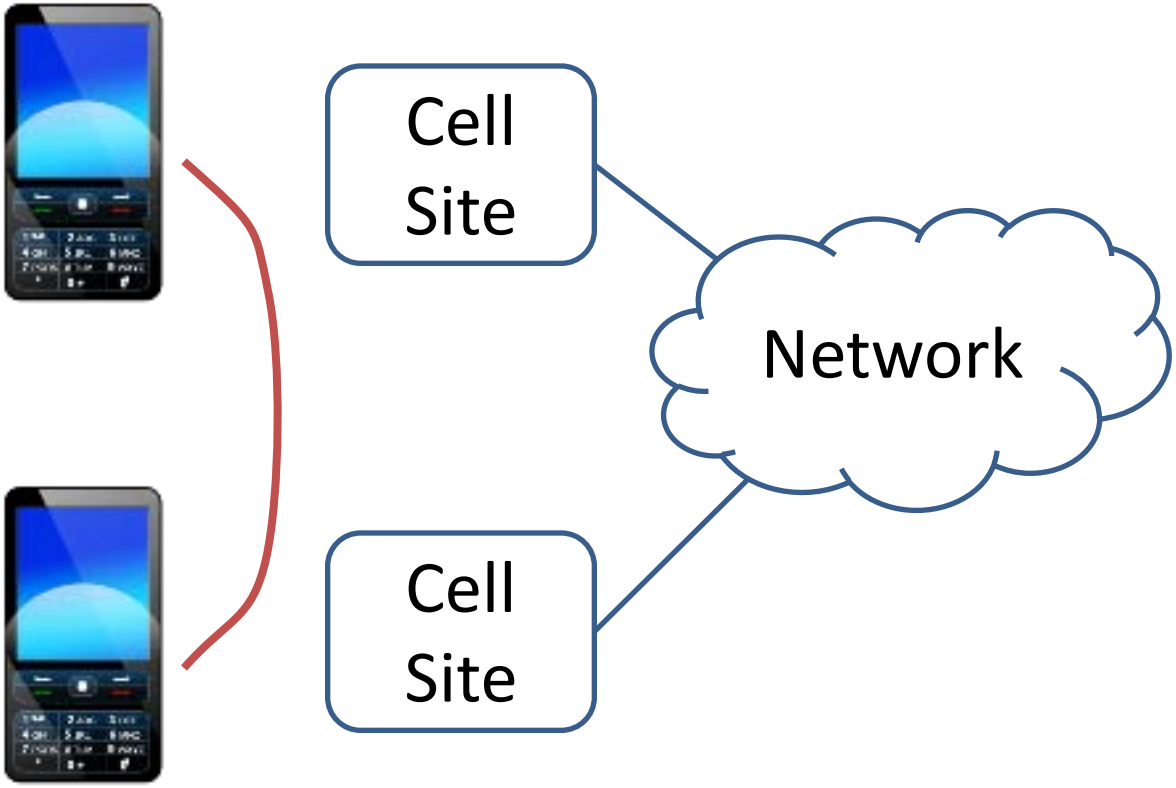
Proximity services (ProSE)

Network Assisted Discovery



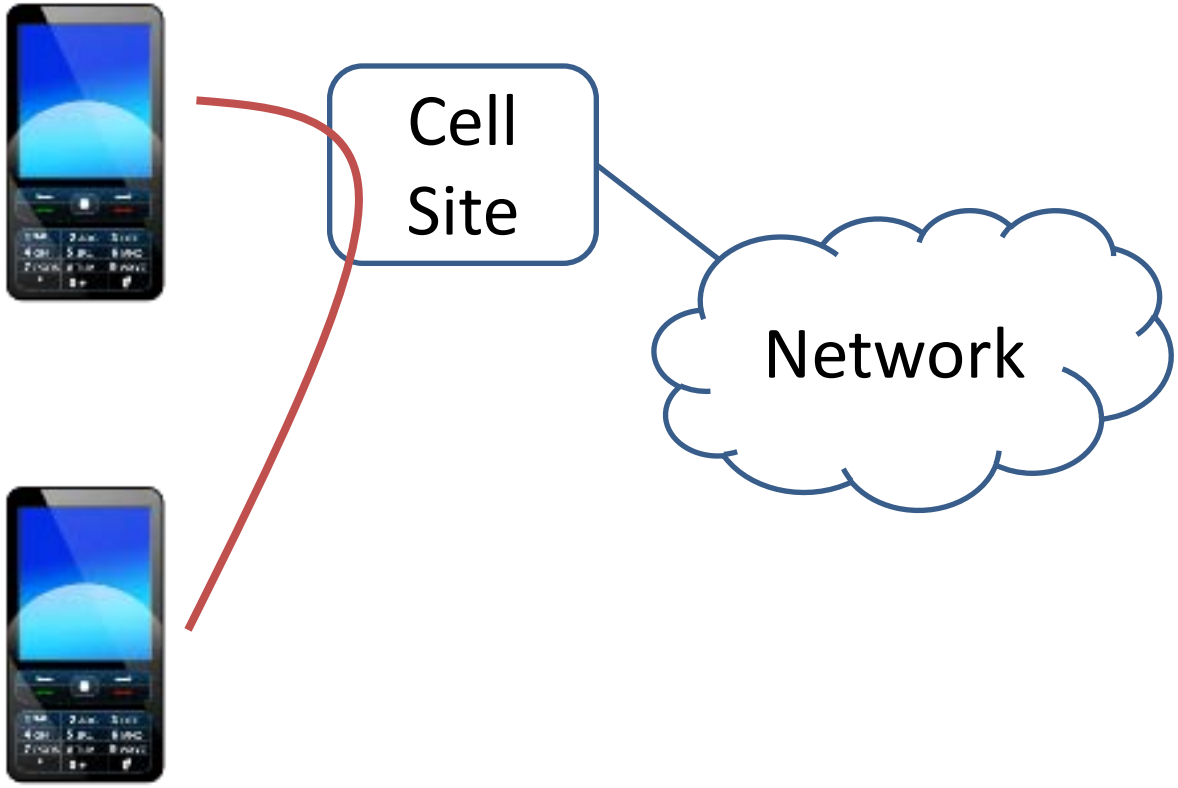
Proximity services (ProSE)

Direct Communication with Proximity Service



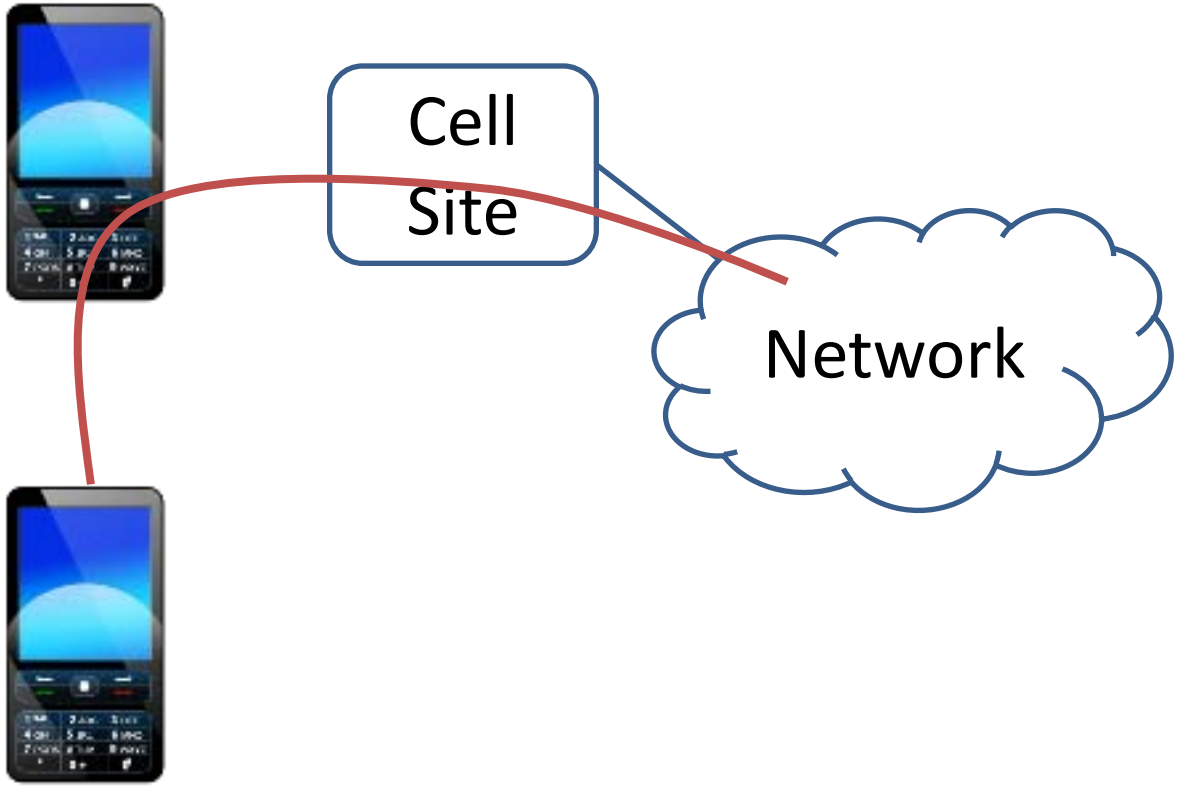
Proximity services (ProSE)

Locally Routed Communication with Proximity Service



Proximity services (ProSE)

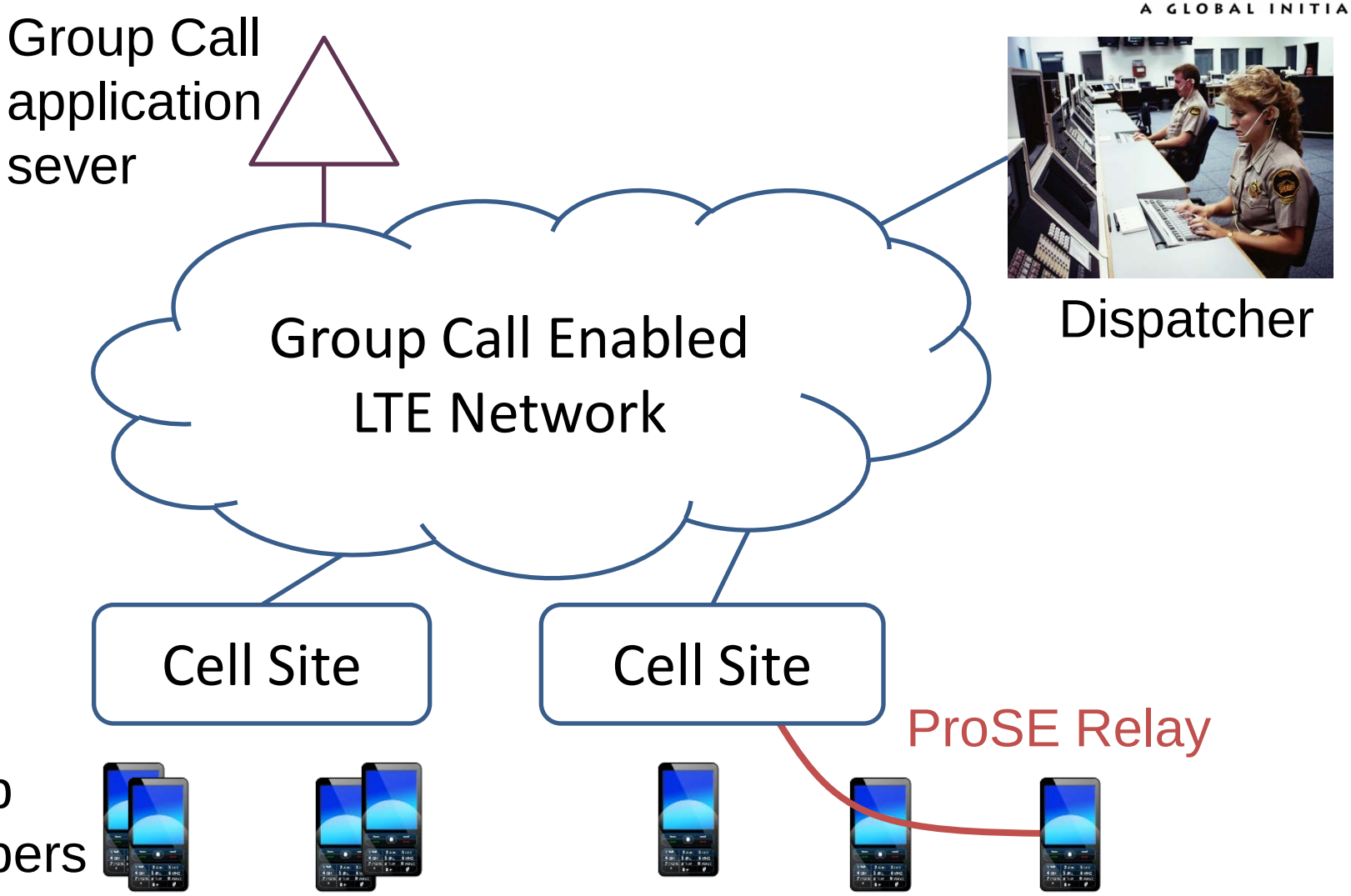
User Equipment to Network Relay



Group call enablers objectives

- Enable efficient group communication
  - Dynamic groups with mobile users and dispatchers
  - Support for floor control (eg push to talk mode)
  - Large groups (perhaps up to 5000)
  - Low latency to add users, obtain channels
- Group call application is separate from the 3GPP system enablers
  - Application is outside the scope of 3GPP

Group calling



Group call application/enabler split

- Split between application and LTE layers still being developed. Proposals:
  - Application layer: group management, floor control decisions, legacy interoperability
  - LTE layer: mobility, service continuity, radio efficiency
  - Joint: performance, service interaction
- What is the nature of the APIs?
  - Pure IP sockets? What is the application protocol?
  - Something non-IP?

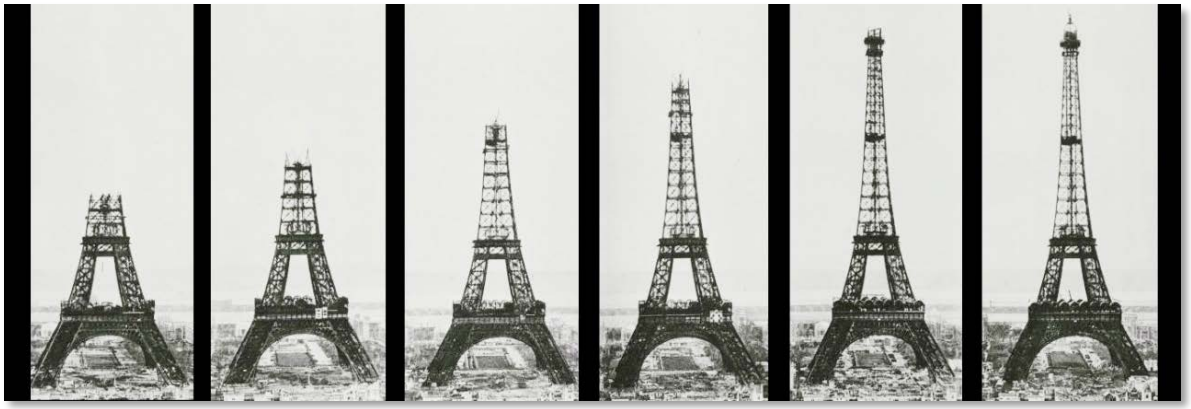
3GPP public safety work items

Work Item	3GPP Release	Work Item Document Reference
Proximity-based Services Specification (ProSe)	12	SP-120883
Group Communication System Enablers for LTE (GCSE_LTE)	12	SP-120876
Public Safety Broadband High Power User Equipment for Band 14 for Region 2	11	RP-120362

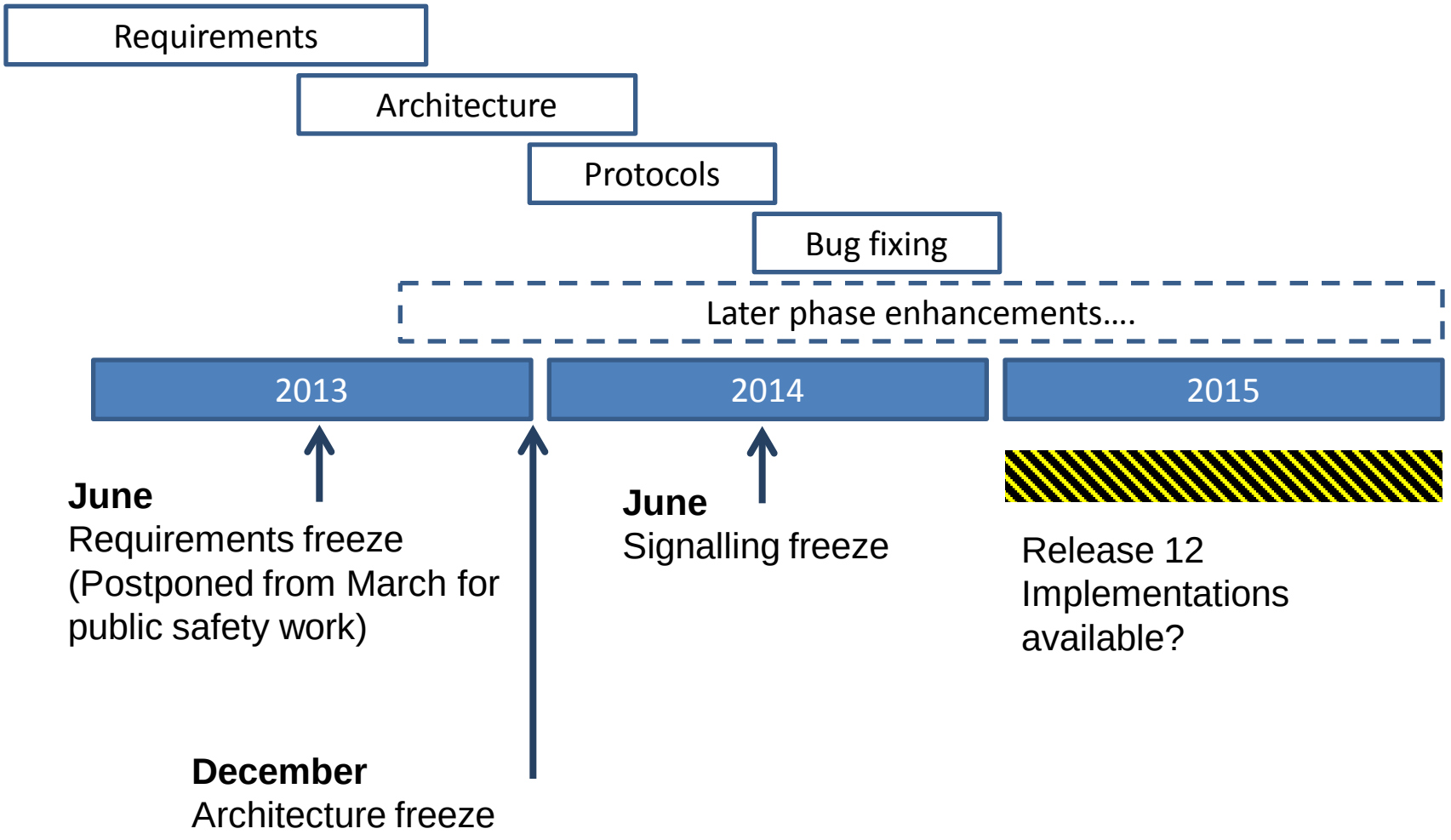
http://www.3gpp.org/ftp/Information/WORK_PLAN/

3GPP Phasing

- 3GPP Standards releases last 18-24 months
- Major work items typically span several releases
  - Break complex problems in to solvable pieces
  - Deliver minimum viable solution and enhance later
- Anticipate that public safety will span more than one release



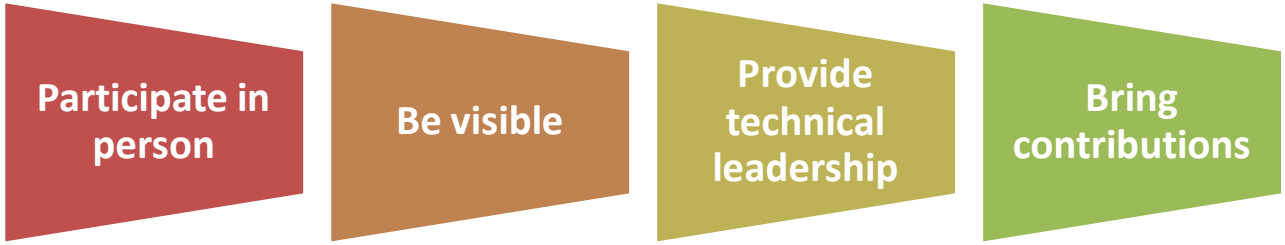
3GPP Release 12 roadmap



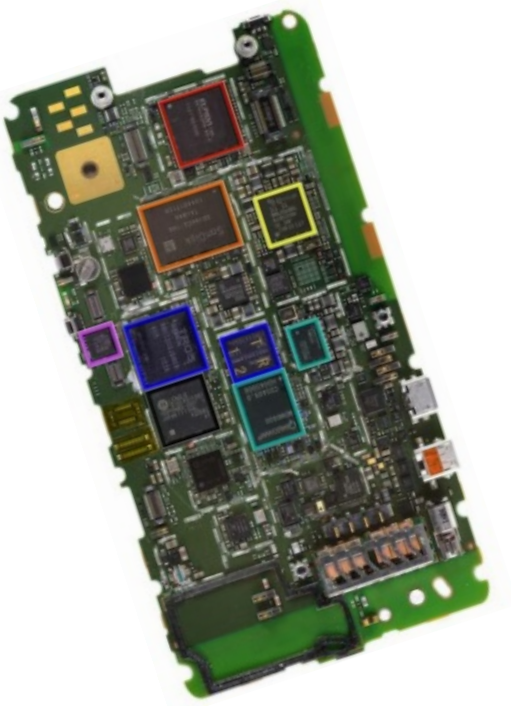
Migration and legacy interworking

- Commercial cellular industry has strong requirements on smooth technology migration and interworking
  - The tighter the legacy interworking the more costly/complex the system
- Interworking requirements between Critical Communications Broadband and TETRA need to be carefully considered
  - Common groups
  - Voice migration (co-existence of VoIP and TETRA voice)
  - Handset capabilities

Delivering architecture and radio standards



- Liaison statements are a poor substitute for knowledgeable people in the meeting
  - We need your physical presence and active participation
- Take care to preserve meaningful reuse of COTS LTE technology
- 3GPP must balance priorities of all members
  - Contributions drive the work



Work beyond 3GPP

- Standards are one element in enabling a market
  - 3GPP will deliver LTE enhancements for public safety in Release 12
- Potential users need to also consider:
  - Spectrum
  - Regulation
  - Application designs
  - Legacy coexistence and migration strategies
  - Handset and infrastructure ecosystem

Conclusion

- 3GPP has started work on public safety standards
  - Meet market needs in an interoperable manner
- 3GPP is cooperating with the public safety community
  - Technical participation in Release 12 is needed
- Where to balance benefits of reuse Vs customization?
  - New business opportunities with commercial mobile operators
- Interworking and migration need careful consideration
- LTE based public safety networks
  - Use common off the shelf technology
  - Improve on existing capabilities with broadband and multimedia

Thank You !

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More Information about 3GPP:

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