

# Centralized RAN

# NOKIA



# Centralized RAN serves large crowds in popular-events

- Broadband connectivity to large concentrations of people within a defined area
- subscribers generating large amounts of Uplink traffic in a dense environment
- Sharing unique moments in an instant



# Centralized RAN – addresses the UL challenge in mass events

August 2015 Gothenburg, Sweden

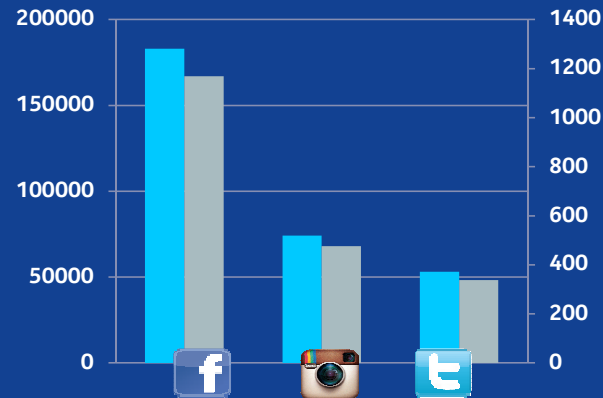
Concert attendance

63,000

Concert uplink  
Served data

Photo uploads

Video uploads



Average data upload  
per minute during  
Metallica 2h concert  
→ 110 GB/2 hours

0.92 GB/min

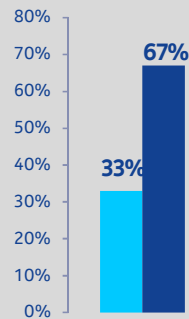
Increase in UL  
traffic during 2h  
Metallica  
performance

460%

Traffic distribution

UL  
traffic

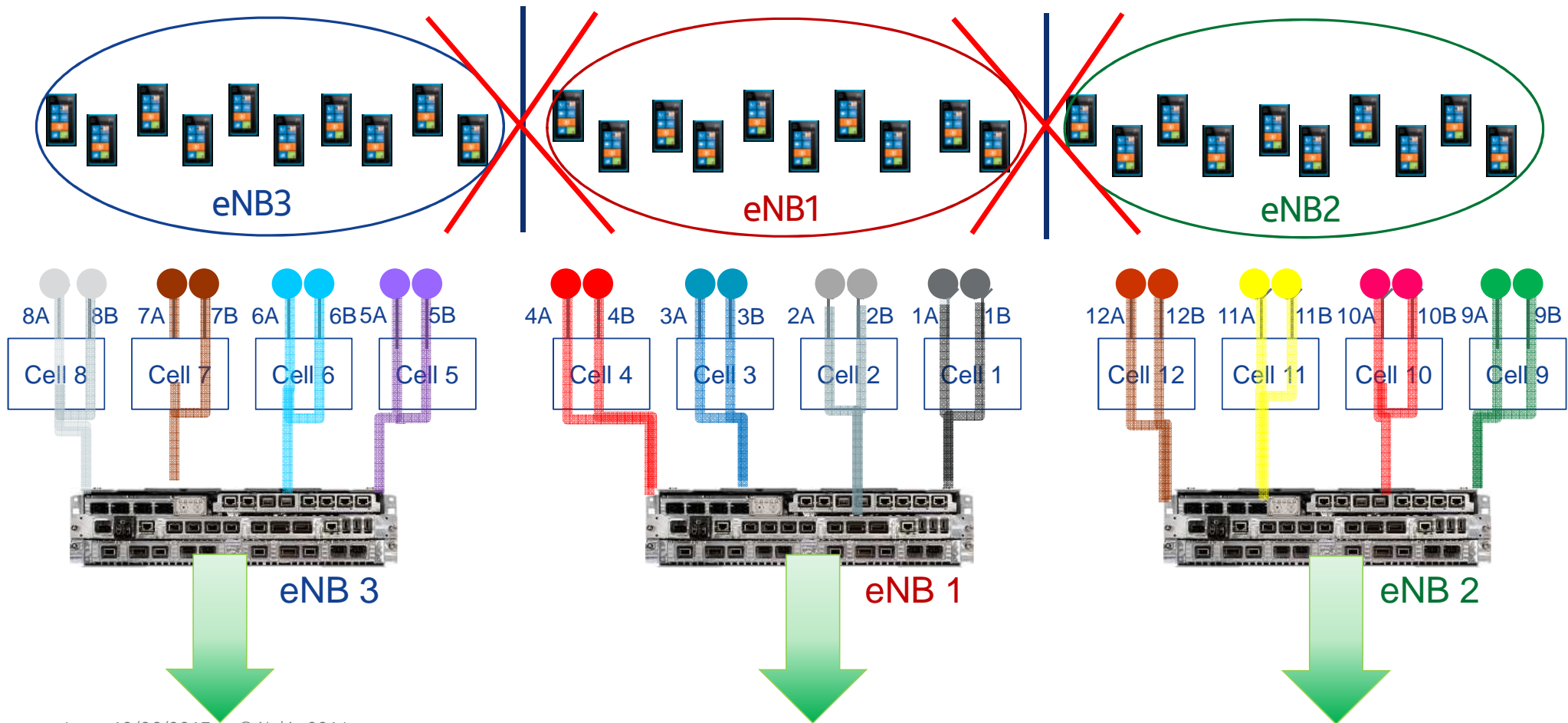
DL  
traffic



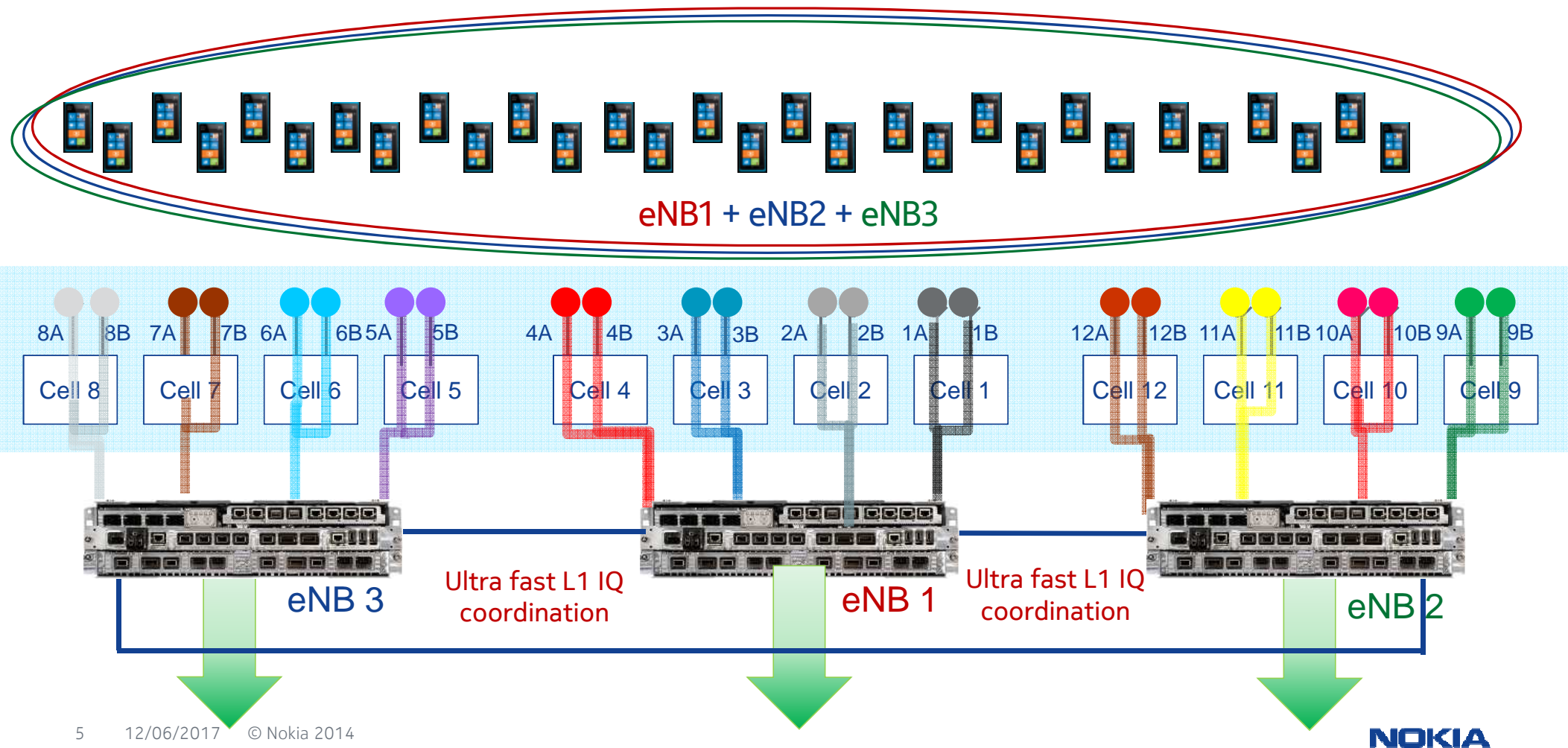
Metallica starts playing



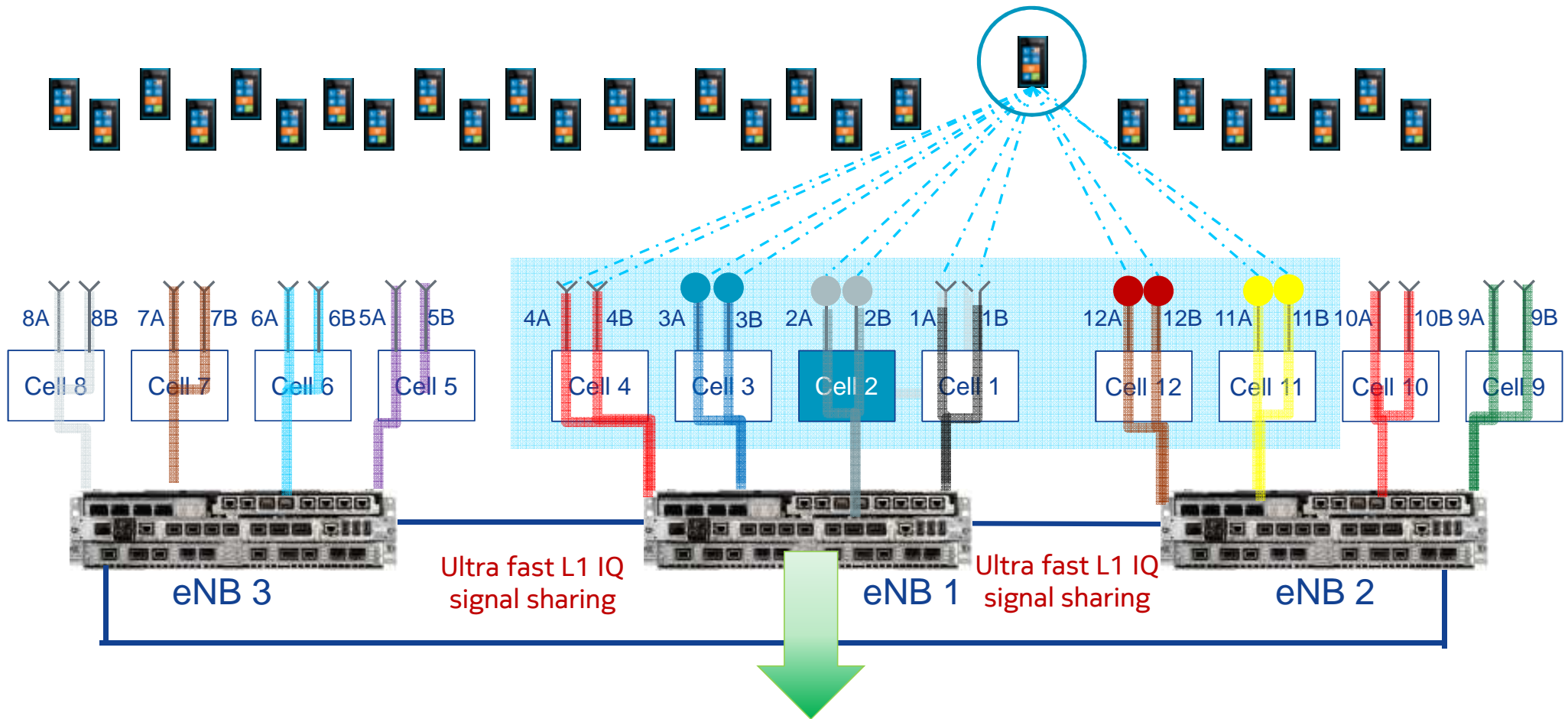
## Fixed cell boundaries – cell edge problems



# Centralized RAN: dynamic user-centric network with virtual clusters



# Dynamic Virtual Clusters - 1 ms snapshot for 1 served user



## Nokia Centralized RAN (CRAN) → Dynamic User-Centric networking

### Unique Innovations

#### Virtual clusters

- Dynamic network re-configuration for best-fit end-user environment
  - Optimised for every active user, every ms
  - Moving Aperture Antenna Selection (MAAS)
  - 12-Rx Diversity
  - 8-way IRC-Rx algorithm
- Convert neighbor cell interference into useful data traffic
- Ultra Dense Cell Grids (x\*10 meter cell radius); no penalties to network performance

### Benefits

- Maximized spectral efficiency & use
- 150% average UL capacity gains in UL-data dominated mass-events;
- Eliminates cell edge degradation  
→ up to 10x increase in cell edge UL speeds
- “more the signal spill-over, higher the gains”
- Works with all existing R8 LTE terminals
- Supports existing DAS systems
- Available for existing Nokia eNB equipment
- Special Events Optimization services by NPO for best results & network evolution

# Nokia Centralized RAN Proven Track Record

Turning interference into useful traffic for 1,5M spectators already

## Centralized RAN delivers REAL performance

All commercial deployments with significant network performance increase

Average cell  
UL capacity  
gain

2-3x

Average cell  
edge UL  
capacity gain

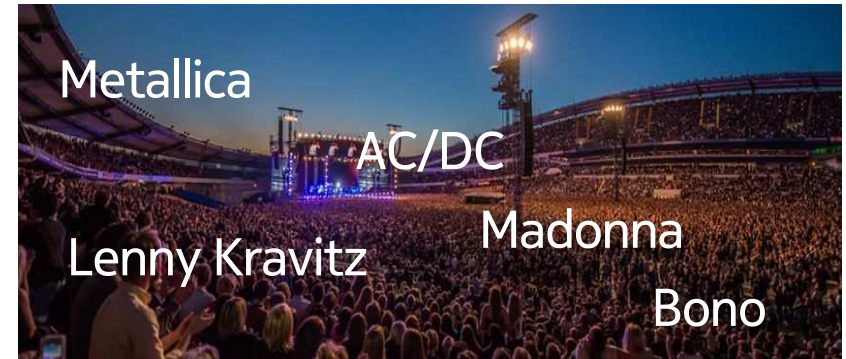
10x

Improved  
downlink  
capacity

5%

Smartphone  
power  
consumption  
decrease

33%





# Live demo setup

