# What will 6G be? A 2023 perspective

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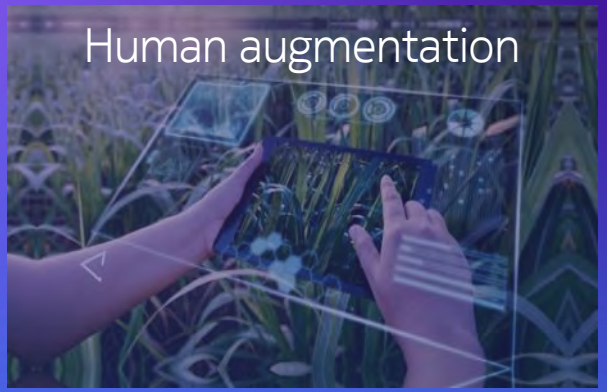
# Defining experience of the 6G Era

## Digital World, Immersive Experience, Metaverse


### Metaverse Industry

Digital twin
Digital co-design
Cooperative Robots

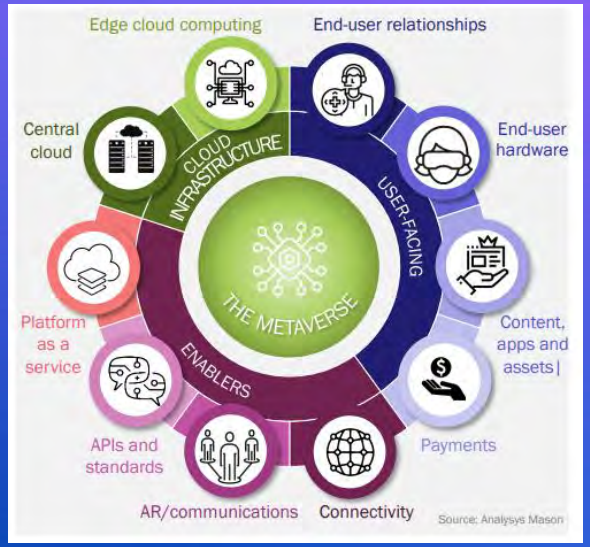
### Metaverse Enterprise

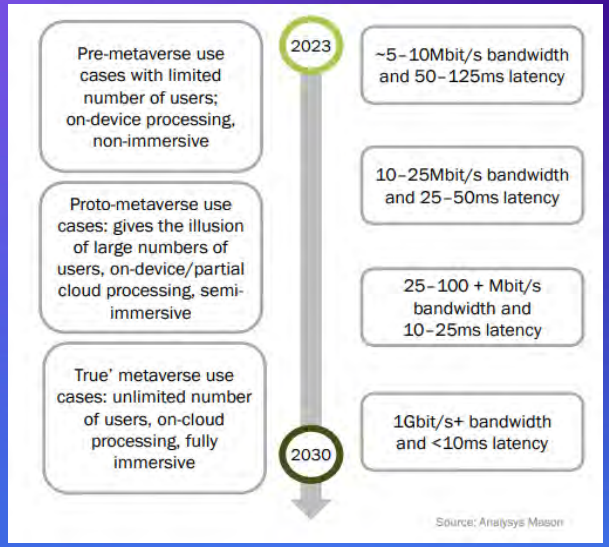
Immersive team collaboration
Training and simulations

### Metaverse Consumer

Gaming & entertainment
Social interactions
Shopping

# What is required?
## An Industry Analyst Perspective

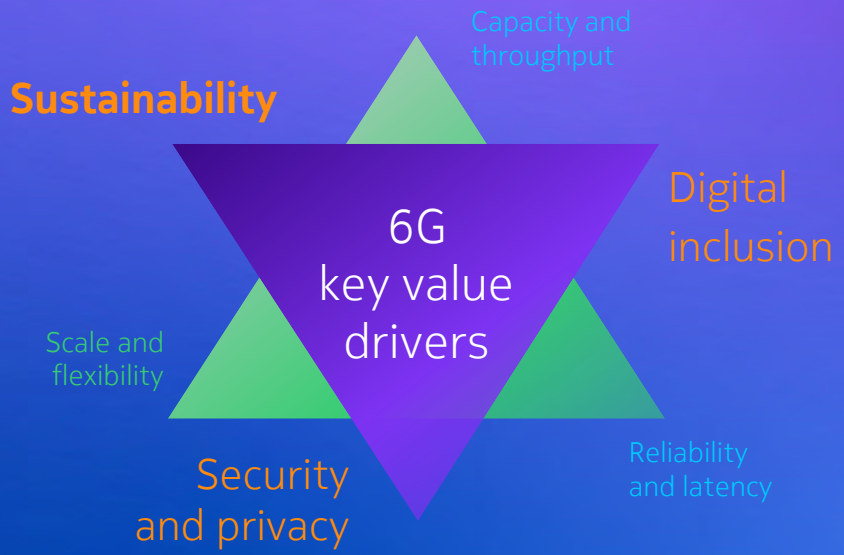



"The telecoms industry must map a new path for connectivity as the metaverse develops over the next decade. This path should shape thinking about what 6G becomes: a radically different network that behaves like a fabric, rather than a pipe, with an AI mediated, hyper-distributed control plane that runs across network domains that are siloed today"

Source: Analysys Mason

# Wireless system design principles
## In 6G: adding three key value drivers




### Sustainability

- X10 capacity increase with 50% power reduction, compared to 5G

### Digital inclusion

- Aim to address three key factors: accessibility, affordability and consumability

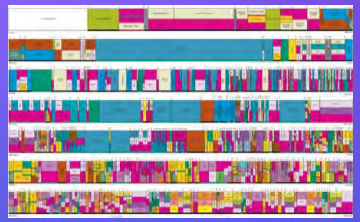
### Security and privacy

- Increasing security and privacy risks require higher levels of control

# The path to 6G

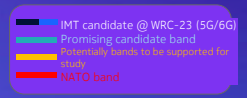
## Spectrum

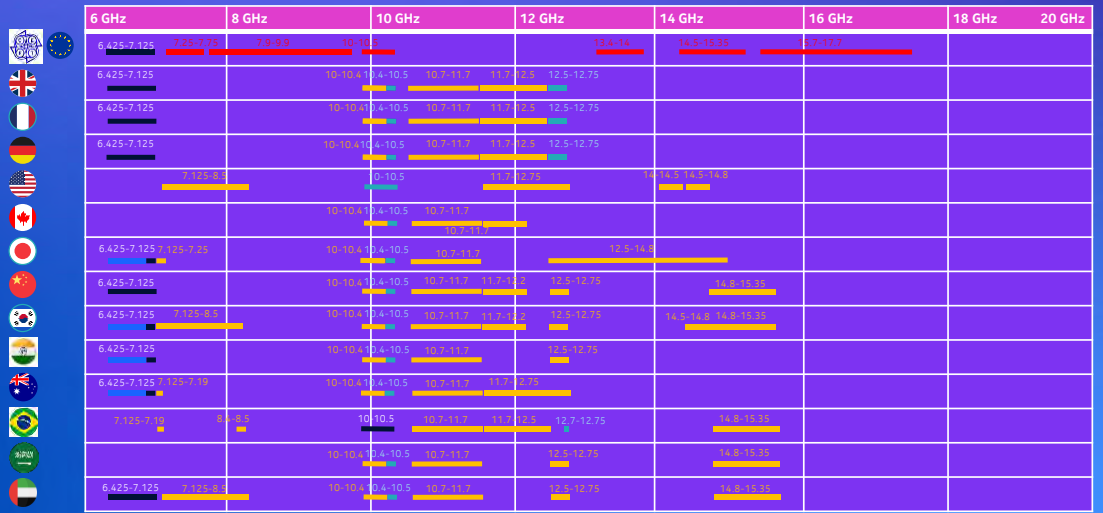
Digital physical fusion



Spectrum 4x

### 6.425/7-15.35 GHz spectrum prospective bands for 6G



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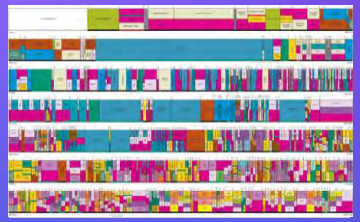
# The path to 6G

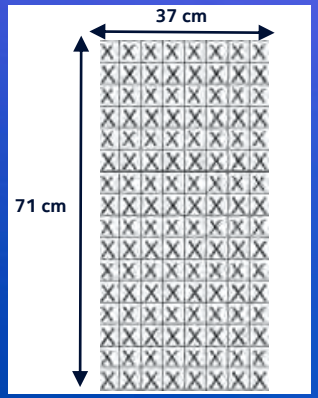
## xMIMO

Digital physical fusion

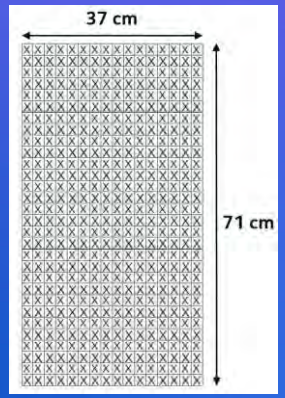
Spectrum 4x



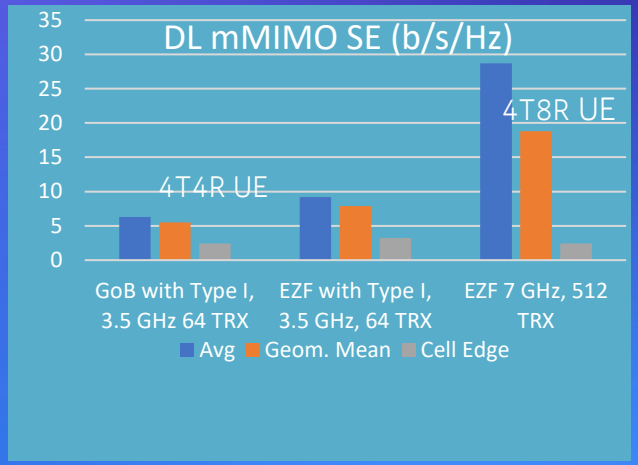
xMIMO 2x-3x




256 radiator size @ 3.5 GHz




1024 radiators (7 GHz) for same dimension

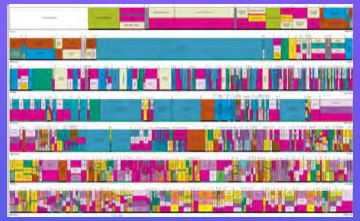


# The path to 6G

## Energy Efficiency

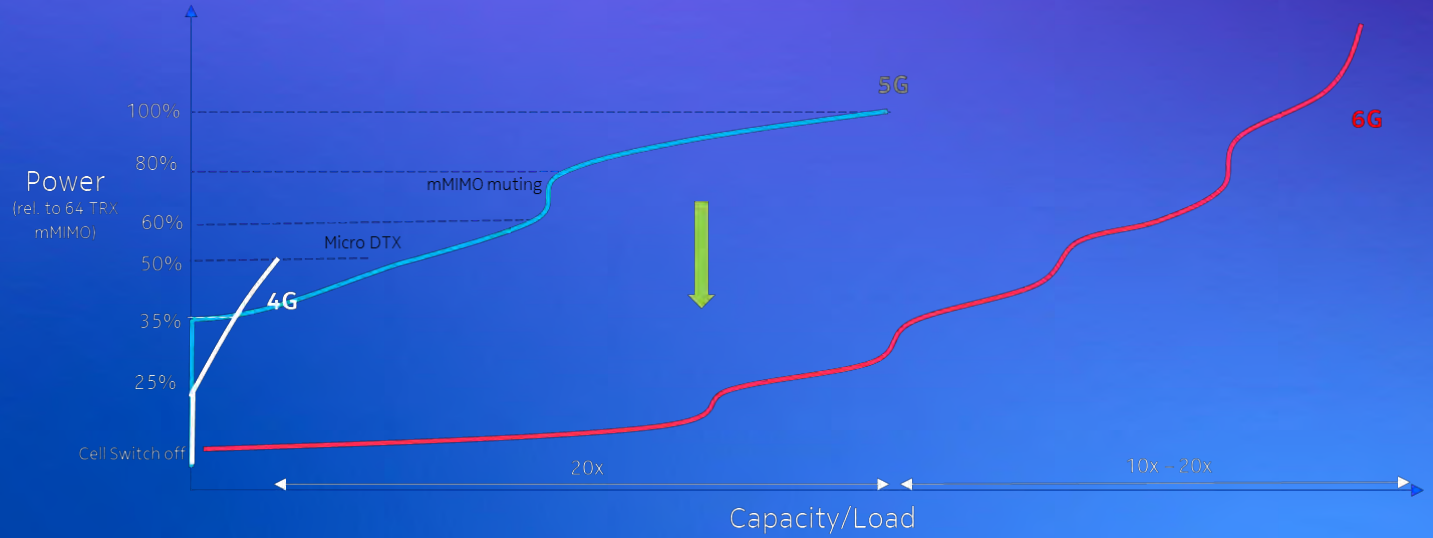
Digital physical fusion

Spectrum 4x



xMIMO 2x – 3x

Energy efficiency 50%



# The path to 6G

## Energy Efficiency

Digital physical fusion

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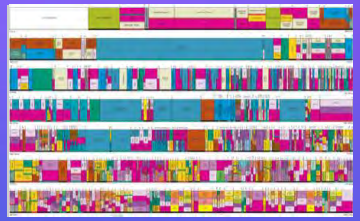
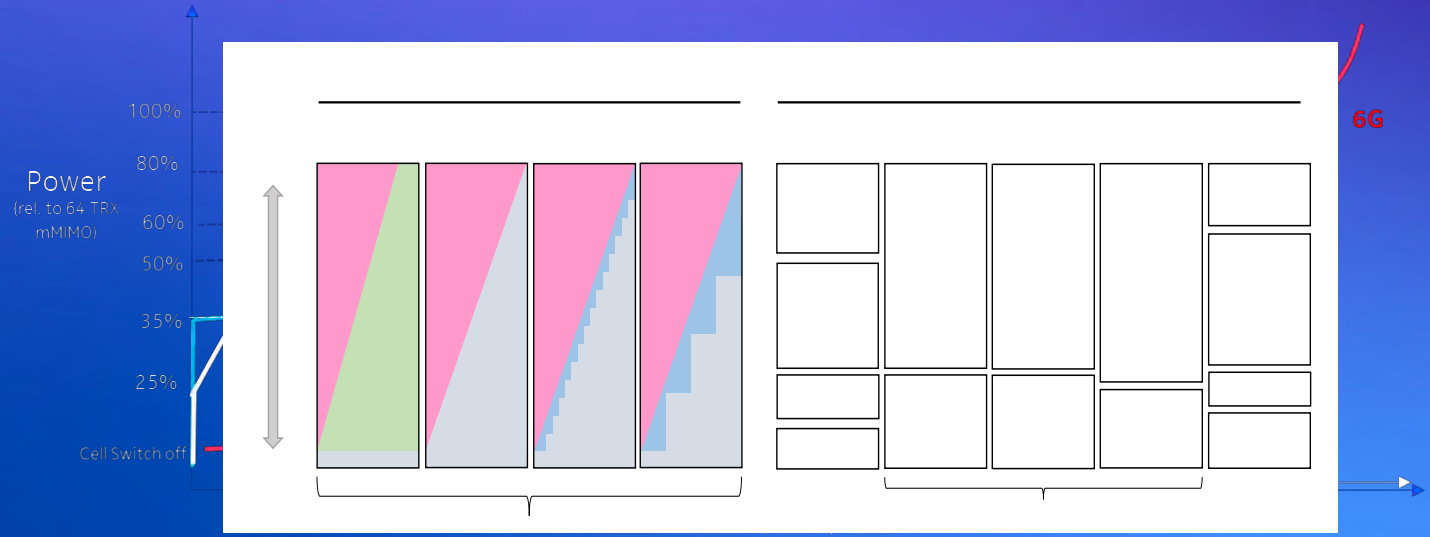


xMIMO 2x – 3x

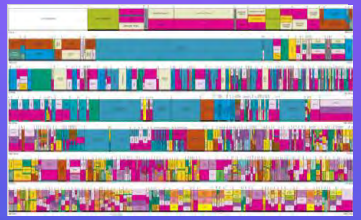
Energy efficiency 50%



# The path to 6G
## AI Native

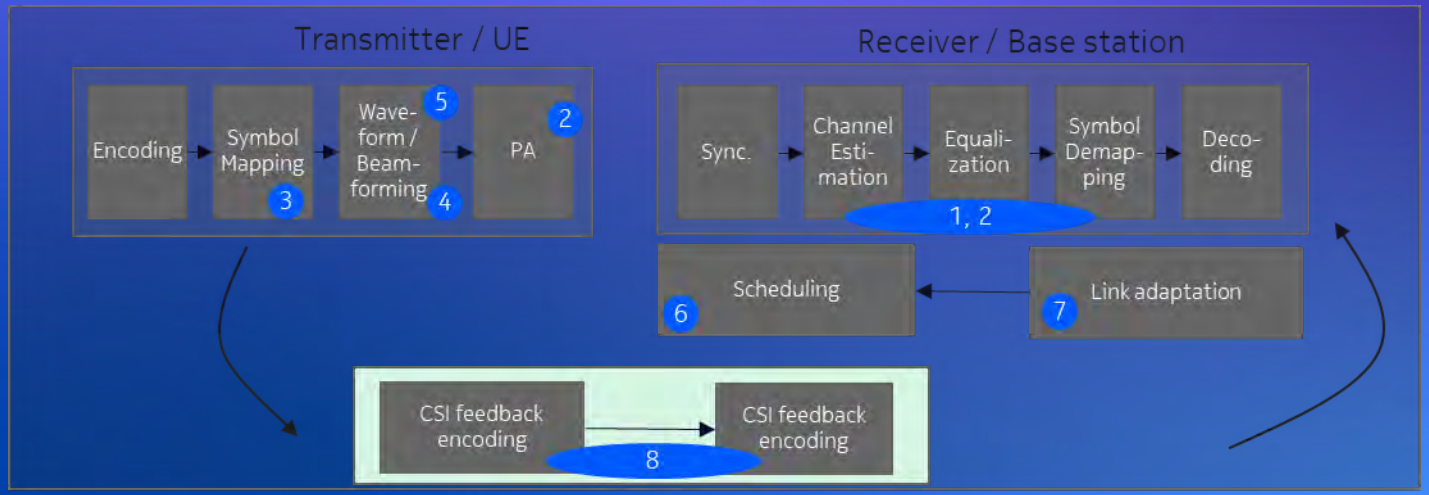
Digital physical fusion

Spectrum 4x



xMIMO 2x – 3x

Energy efficiency 50%




AI Native ~30%

Sequential training | Universal Models | ML Framework | Data architecture

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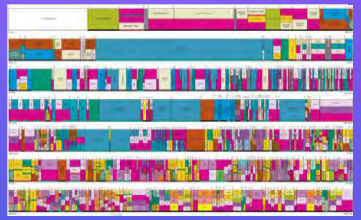
# The path to 6G
## Architecture

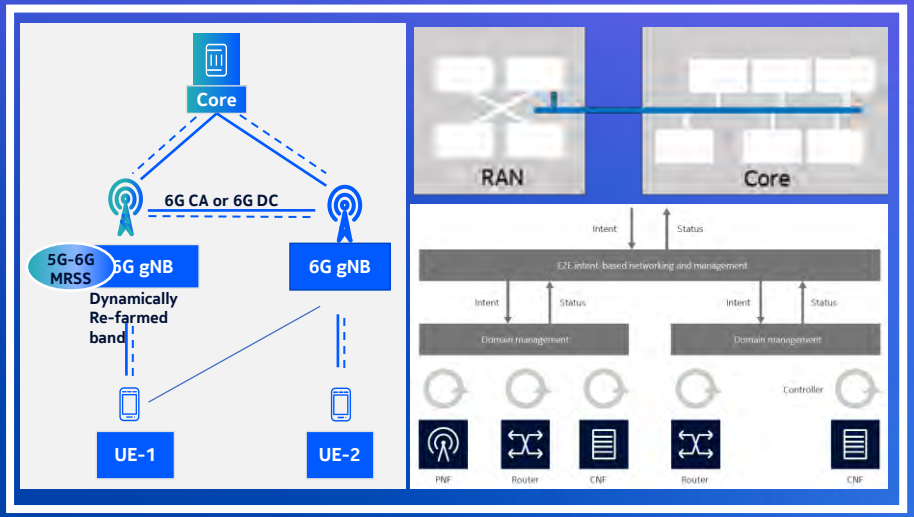
Digital physical fusion

Spectrum 4x



xMIMO 2x – 3x

Energy efficiency 50%



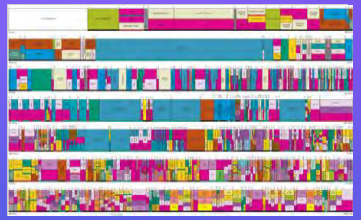

AI Native

Cognitive network & automation

# The path to 6G
## Sensing

Digital physical fusion

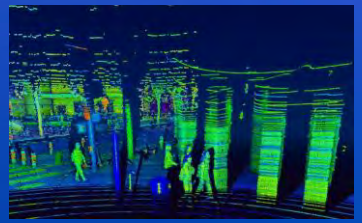
Spectrum 4x



xMIMO 2x – 3x

Energy Consumption 50%

JCAS



What determines the sensing range?

- Near-far problem
- Quantization
- Angular resolution
- Occlusion

SNR is not the limiting factor

| Person | Cars | Drones |
|---|---|---|
| 10m | 100m | 1000m |

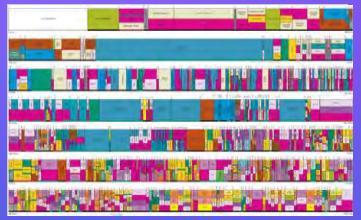
Cognitive network & automation

AI Native

# The path to 6G
## Security and Trust

Digital physical fusion

Spectrum 4x



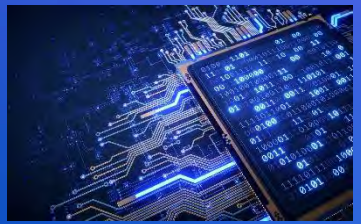
xMIMO 2x – 3x

Energy Consumption 50%

AI Native

Cognitive network & automation

Security, Privacy and Trust



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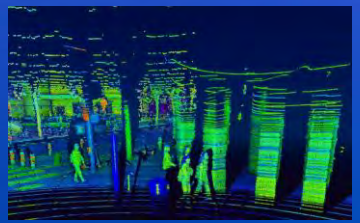
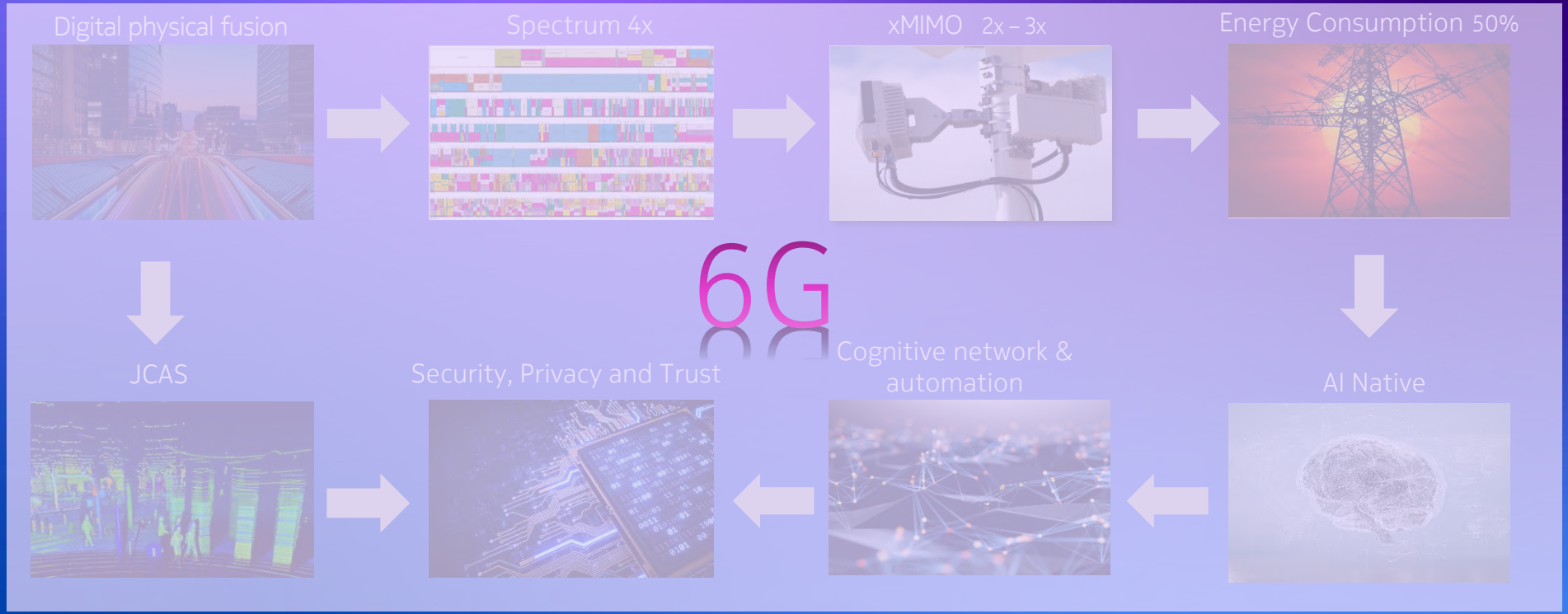


# What is 6G?



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