

INFRASTRUCTURE SHARING IN PRACTICE: SHARING MOBILE NETWORKS

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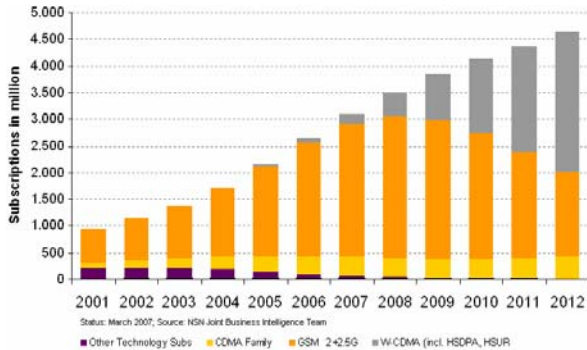
Operator
challenges and
opportunities

Added value for
your business

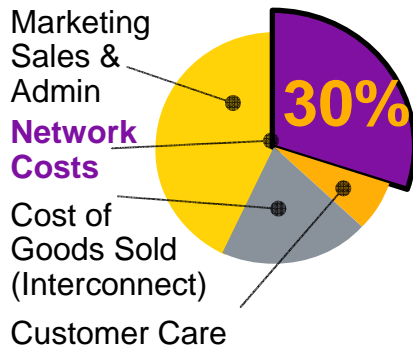
Solution

Market trends and operator challenges

Mobile subscriber Growth



Network Costs represent significant part of operators expenditures



Source: Yankee Group

Market Trend

- Growth in mobile Users and traffic
- Flat data tariffs
- Operators facing costs of managing existing and rolling out new (3G, LTE) networks
- In most markets there are today multiple operators with overlapping coverage

Operator success factor

- ➔ Fast and easy Network rollout
- ➔ Increase operational efficiency
- ➔ Join forces to consolidate the basic mobile coverage and focus on new technologies/services



Market outlook

“We estimate that savings on network build could be as much as **38% of overall CAPEX**, the cost savings from network sharing could stimulate mobile broadband roll-out throughout the industry”

Source: Analysys

‘Our proposal is industry leading and will **enable the two companies** to remain vigorously competitive against each other and the market, **while realizing the proven benefits of network sharing**, notably **faster roll out** of high speed mobile services in the future and the earlier introduction of innovative products.’

CEO of UK leading Operator

“Mobile Operator Network **outsourcing leads to 20-25% reduction in Cash costs** ... Outsourcing has become a more acceptable approach to increasing profitability, as it **offloads the cost burden to the partner firm.**”

Source: Pyramid Research

“The challenge is to optimally utilize available resources while ensuring competition and availability of services at affordable price. **Infrastructure sharing is the crying need of the hour.**”

Source: Telecom Regulatory Authority of India (April 2007)

“**Sharing, collaboration and cost management are prime for survival.** We were the first sharing passive infrastructure, and if government was to support sharing active infrastructure, we would take a lead on that as well.”

CEO of India leading Operator





Operator
challenges and
opportunities

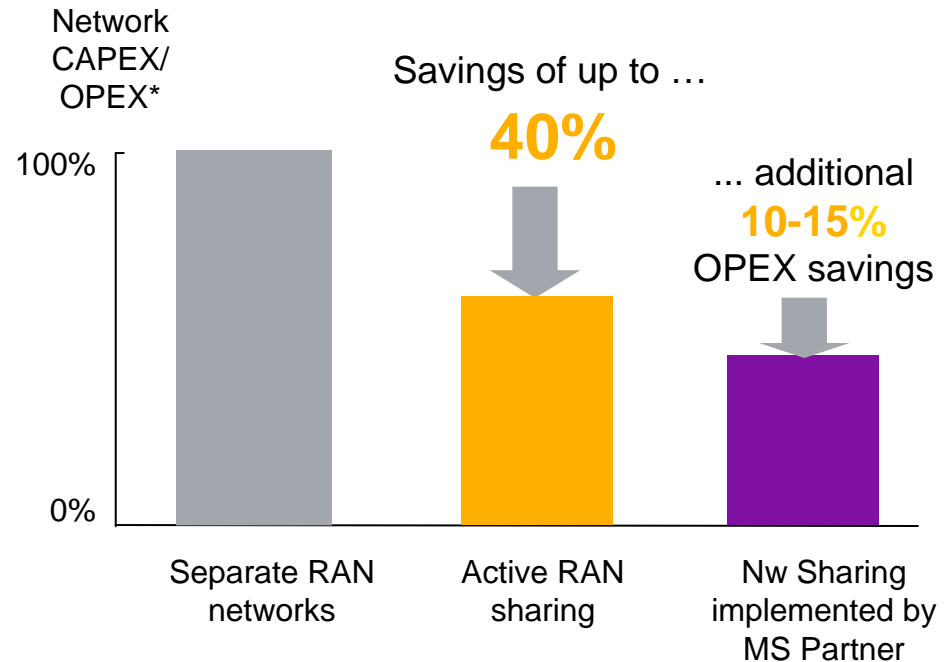
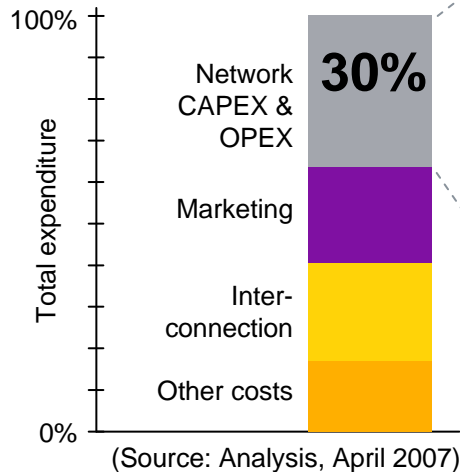
Added value for
your business

Solution

Network sharing solution

Significant network CAPEX & OPEX savings for operators

Typical expenditures for a European MNO

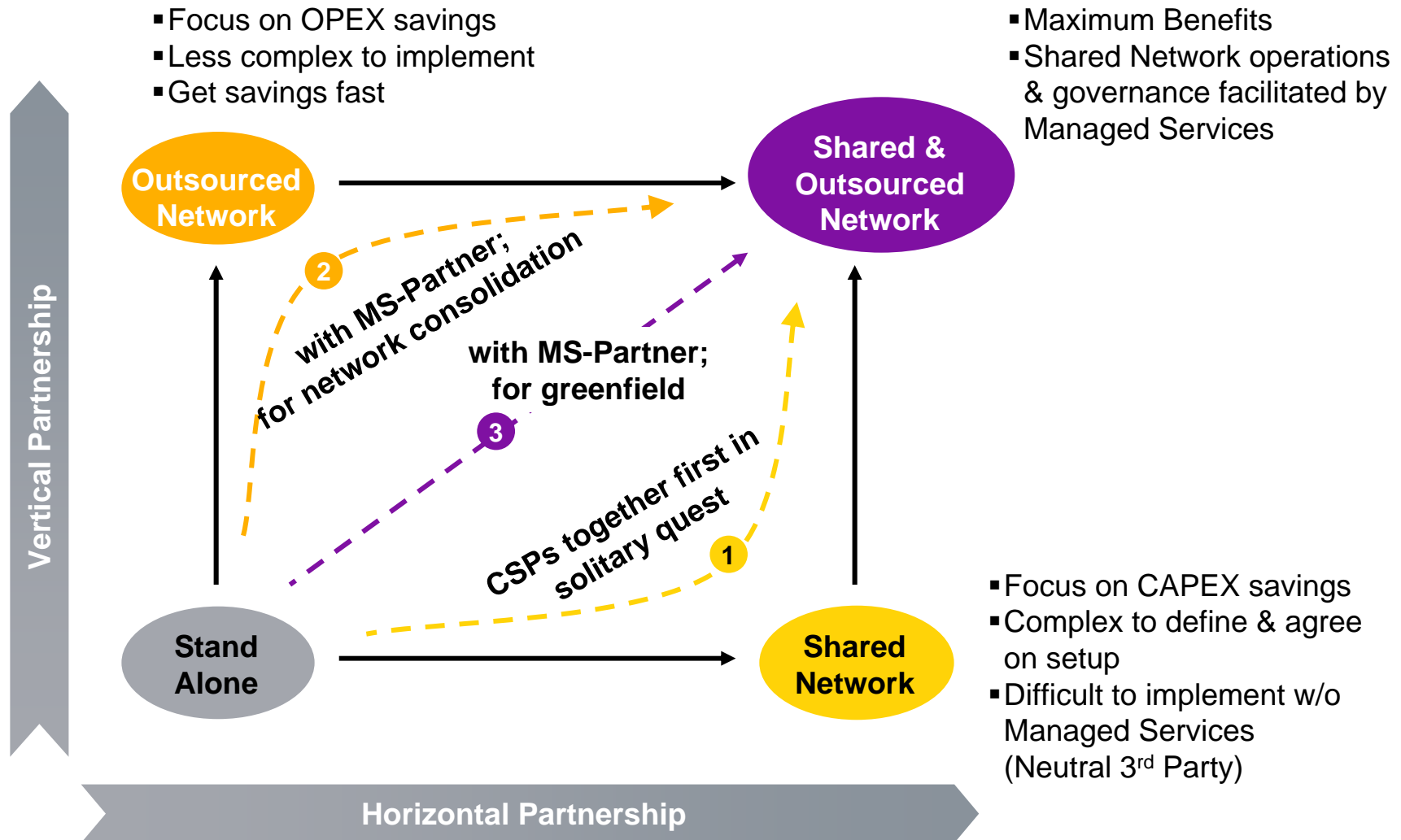


*) Site related OPEX basing on 5 years period / no site consolidation/transition/transformation costs

Highest savings can be achieved if Network Sharing is implemented by a (Managed) Services Partner



Outsourcing & Network Sharing are complementary ways to reduce costs and improve efficiency ...





Operator
challenges and
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Added value for
your business

Solution

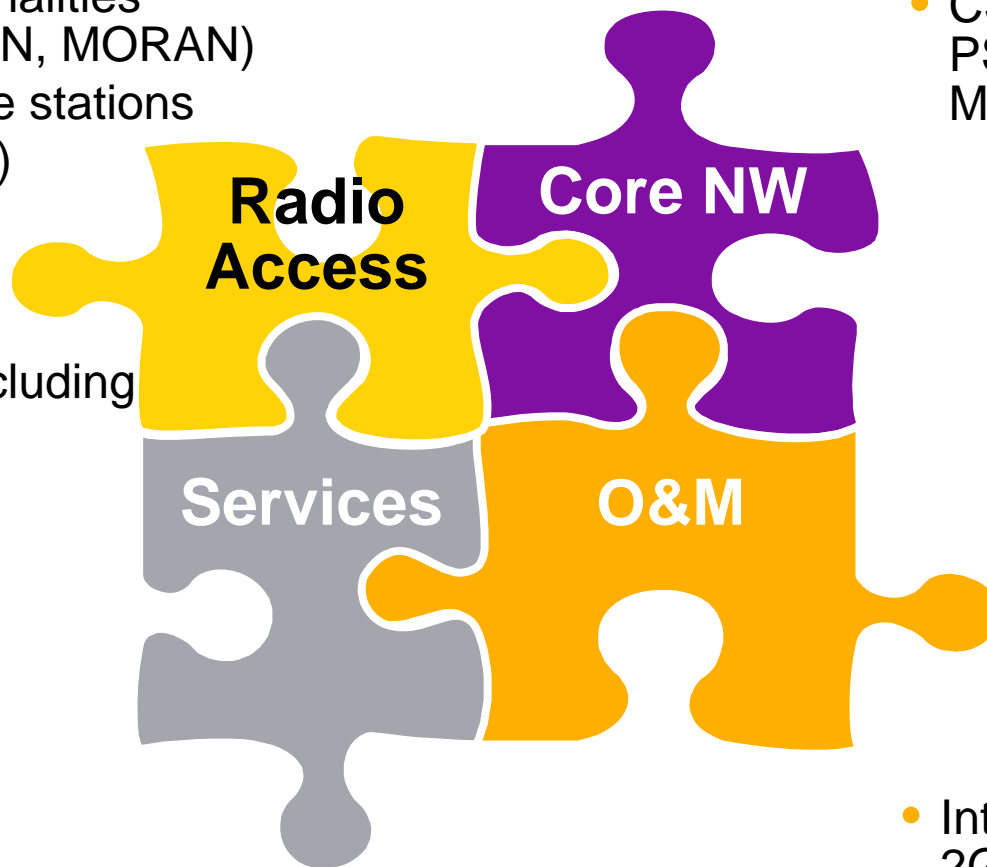


Comprehensive solution for network sharing

Solutions for 2G/3G/LTE

- Routing functionalities (MOBSS, MOCN, MORAN)
- MultiRadio base stations (eNB, NB, BTS)
- Radio network controllers (BSC, RNC)
- Site solution including Antennas and Feeders

- Consulting on Business Transformation
- Planning
- Implementation
- Maintenance
- Managed Services



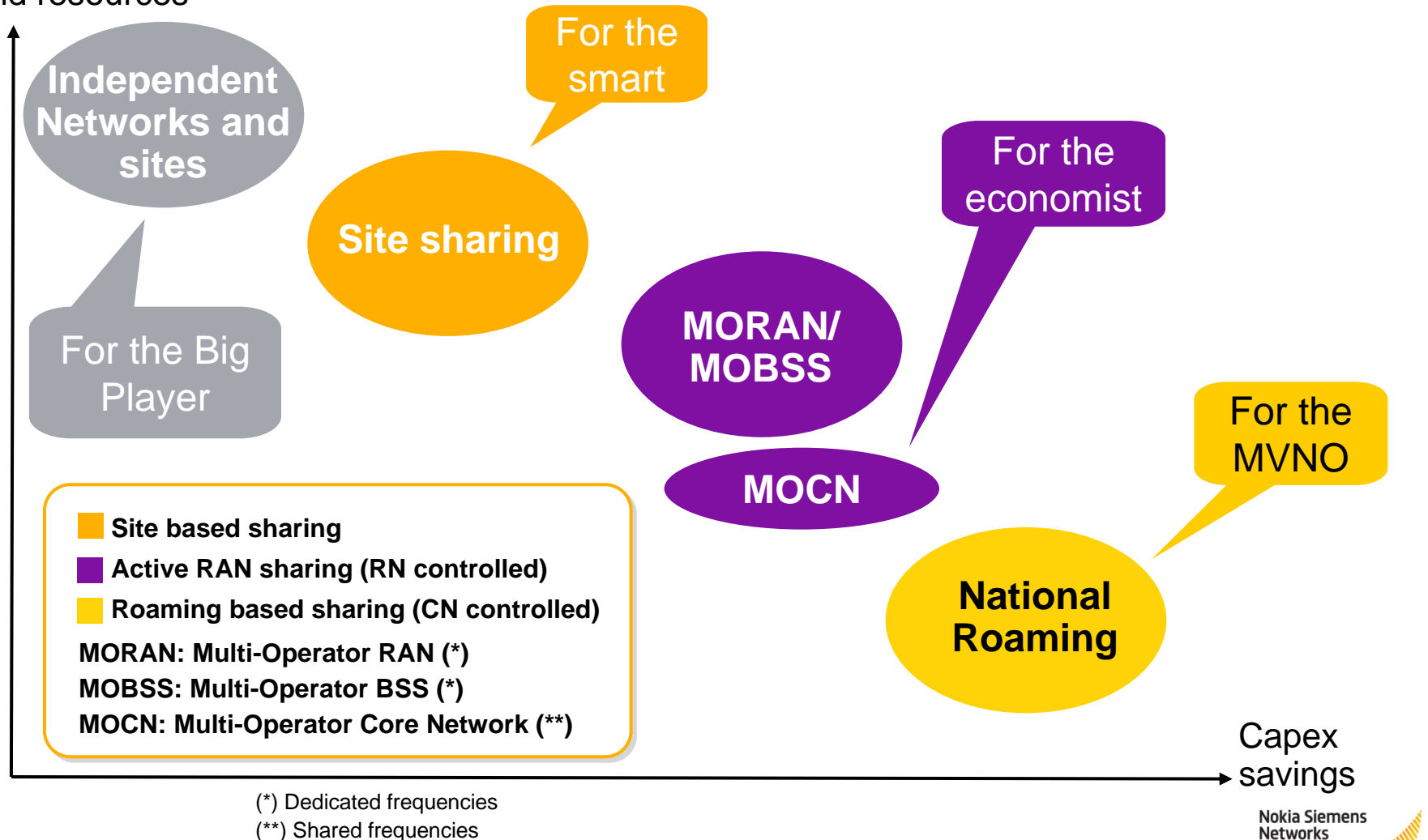
- CS-core: MSC, VLR
PS-core: SGSN, MME

- Integrated O&M for 2G/3G/LTE



... flexibly addressing trade-off between Control over Services and Cost Savings

Control over Services
and resources



... while serving diverse deployment scenarios depending on strategic & business considerations

- Areas with high business potential
- Heavy competition between CSPs
- Service and performance differentiation needed
- Full control of own network assets
- Base method for network consolidation

- Areas with moderate business potential
- Competition between CSPs
- Partial control of network assets

- Areas with low business potential
- Possibly regulatory coverage requirements

Active RAN Sharing

Roaming Based Sharing

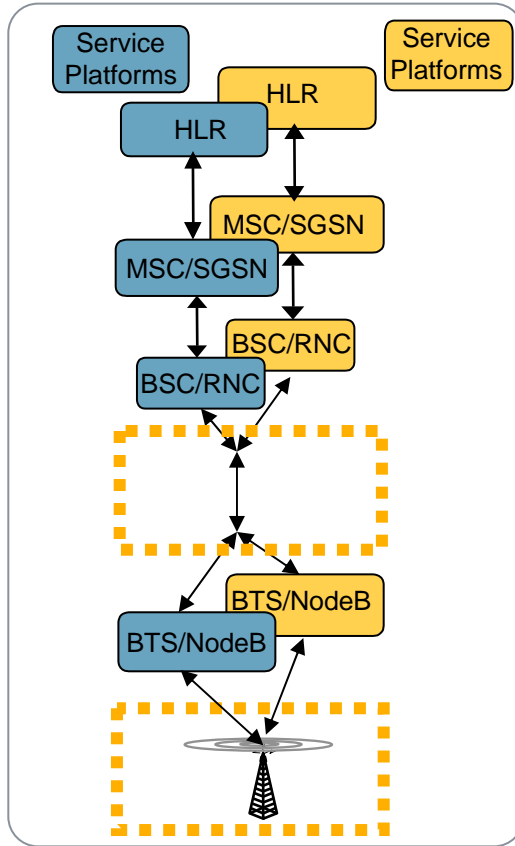
Passive RAN / Site Based Sharing



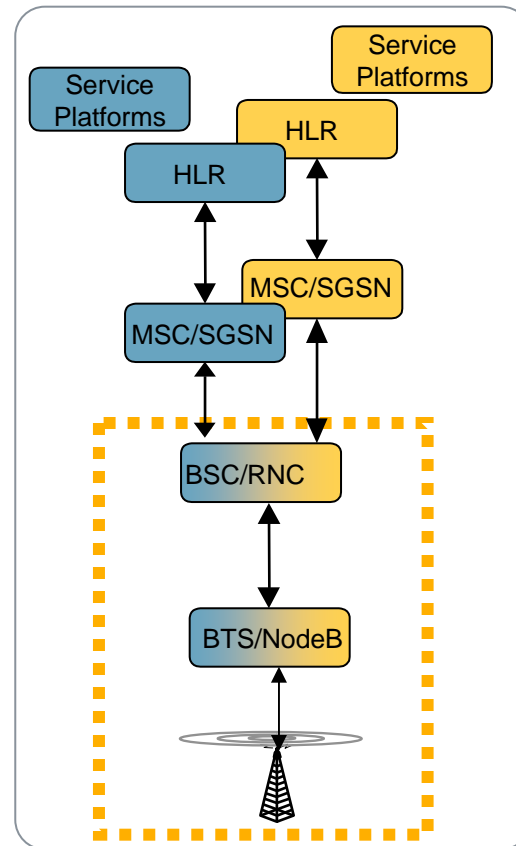
Increasing levels of sharing in mobile networks are supported by different technical solutions ...

Degree of Network Sharing

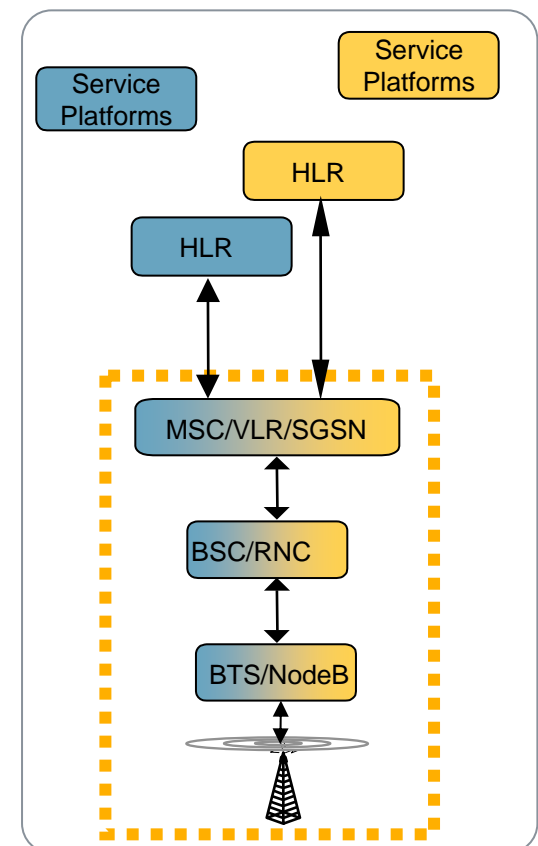
Degree of Network Control



**Passive RAN Sharing
(site w/o transmission sharing)**



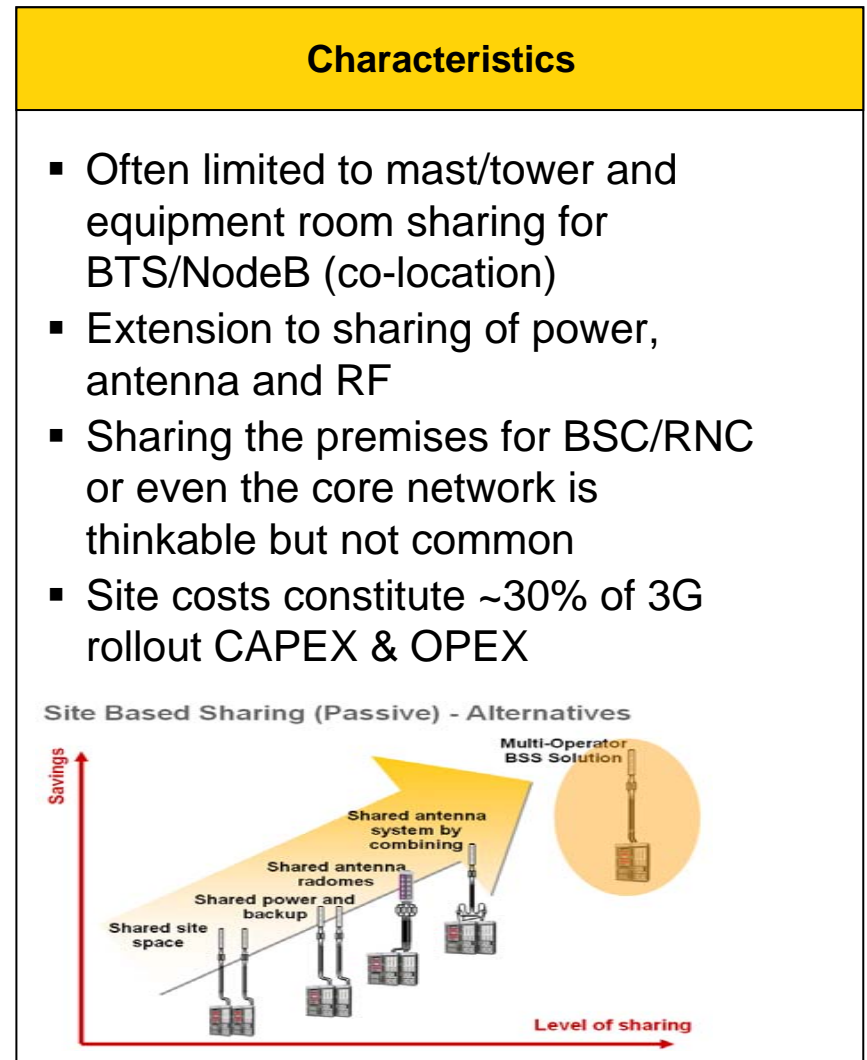
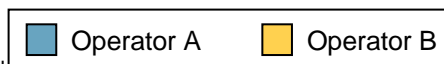
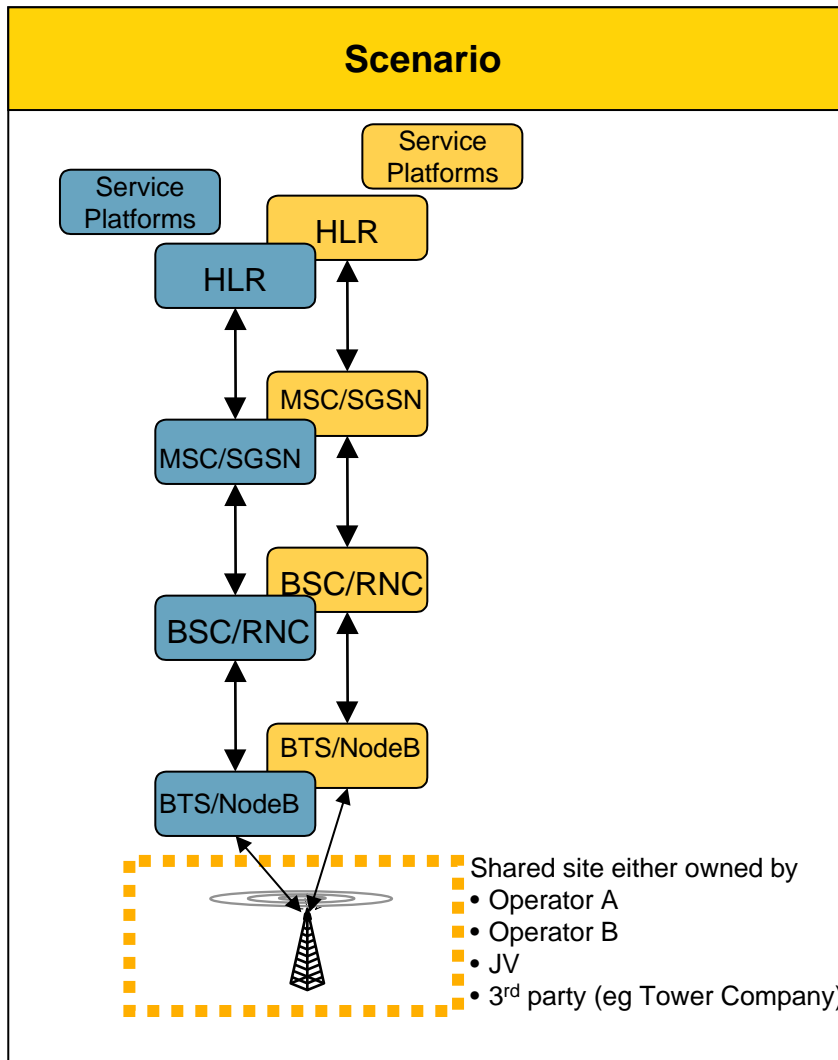
**Active RAN Sharing
(MORAN/MOBSS or MOCN)**



Roaming Based Sharing



Site Sharing



Site Sharing

Pros

- Very minor effect on differentiation potential (other than geographical presence)
- Site rental costs reduced
- Reduction in total number of sites
- Better utilization of scarce resources, i.e. sites, masts and shelters
- Significant reduction in site acquisition cost and build-out effort
- Harmonization of transmission costs

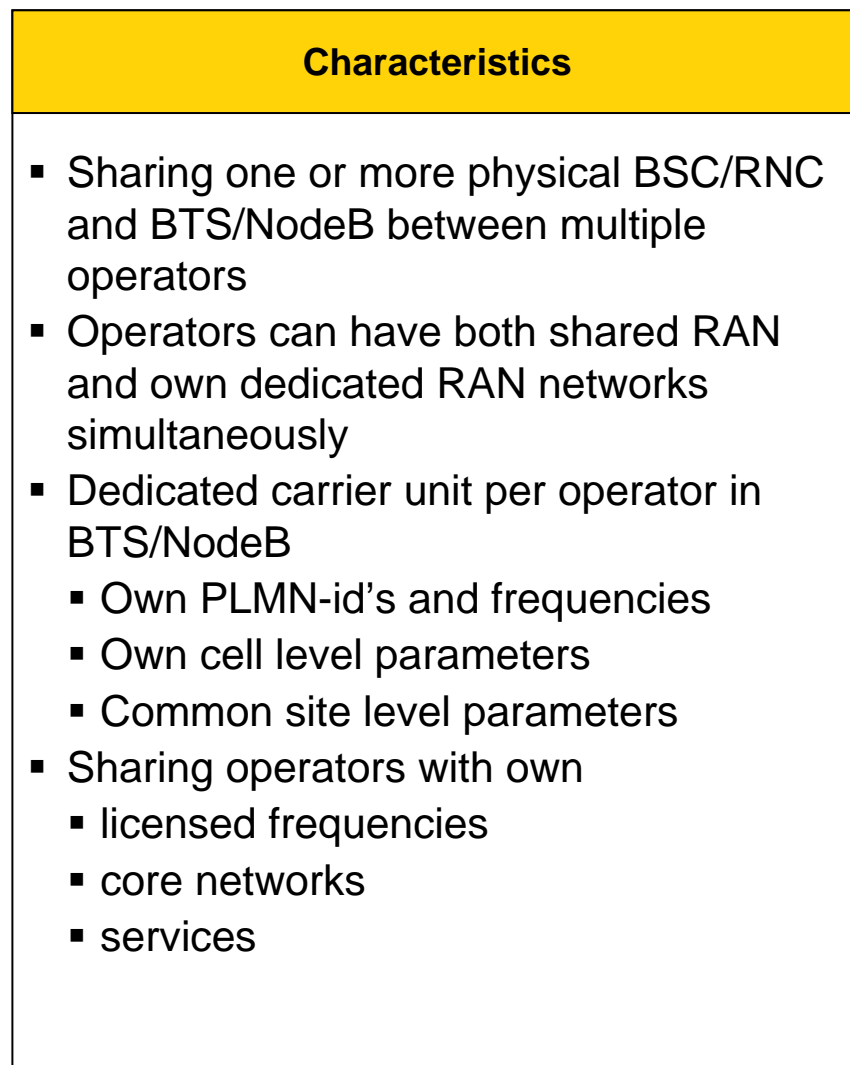
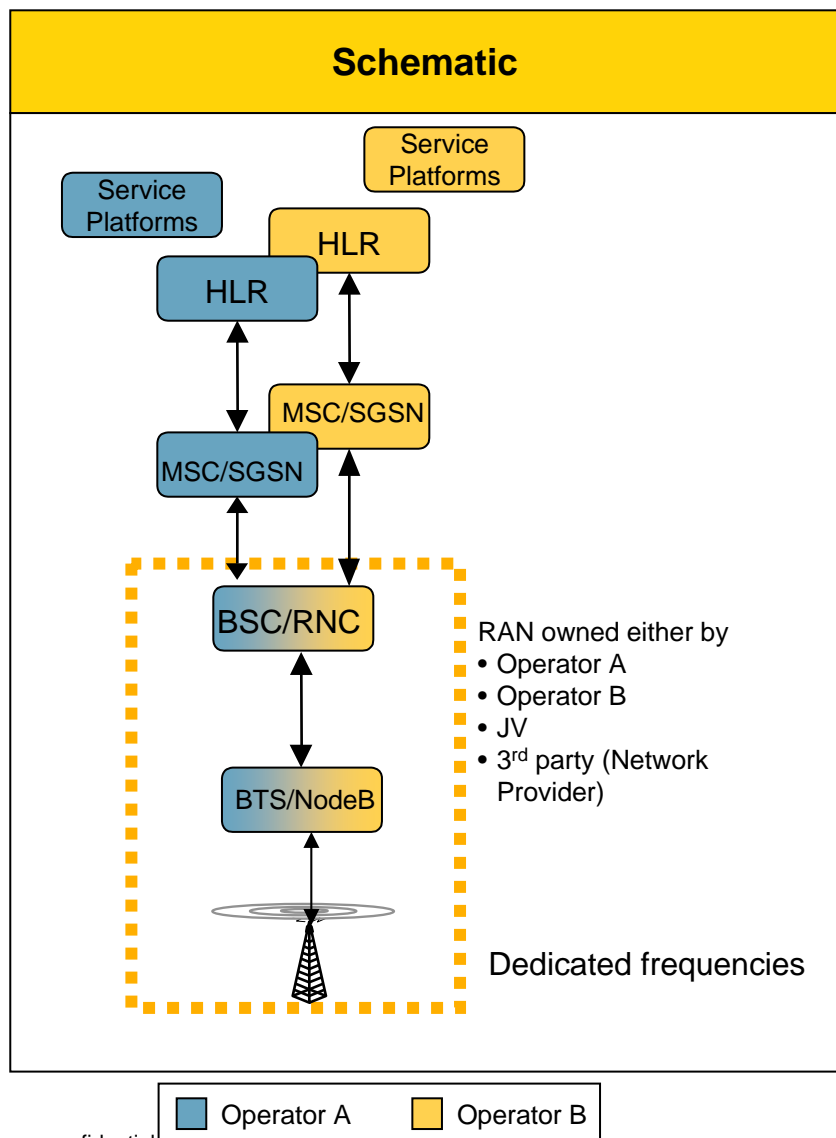
Cons

- Sharing partners need to coordinate site-related operational aspects
- Limited space/room for expansion on certain sites
- Power loss in shared antenna systems requires additional amplification of output power



Active RAN Sharing

Scenario: Multi-Operator RAN/BSS (MORAN/MOBSS)



MORAN; Independent Core, Flexibly Shared Radio

Pros

- Reduction in equipment volume in low traffic areas
- 100% increased rollout speed with given cost
- Reduced network and site operating costs
- In low traffic areas long term cost advantage
- Operators name always visible on phone display
- Operators partly maintain control of their own network traffic (quality & capacity)
- Radio QoS can be applied
- Compatible with any core network
- Independent CN services
- Exit path to own dedicated NodeBs when traffic grows
- No terminal requirements

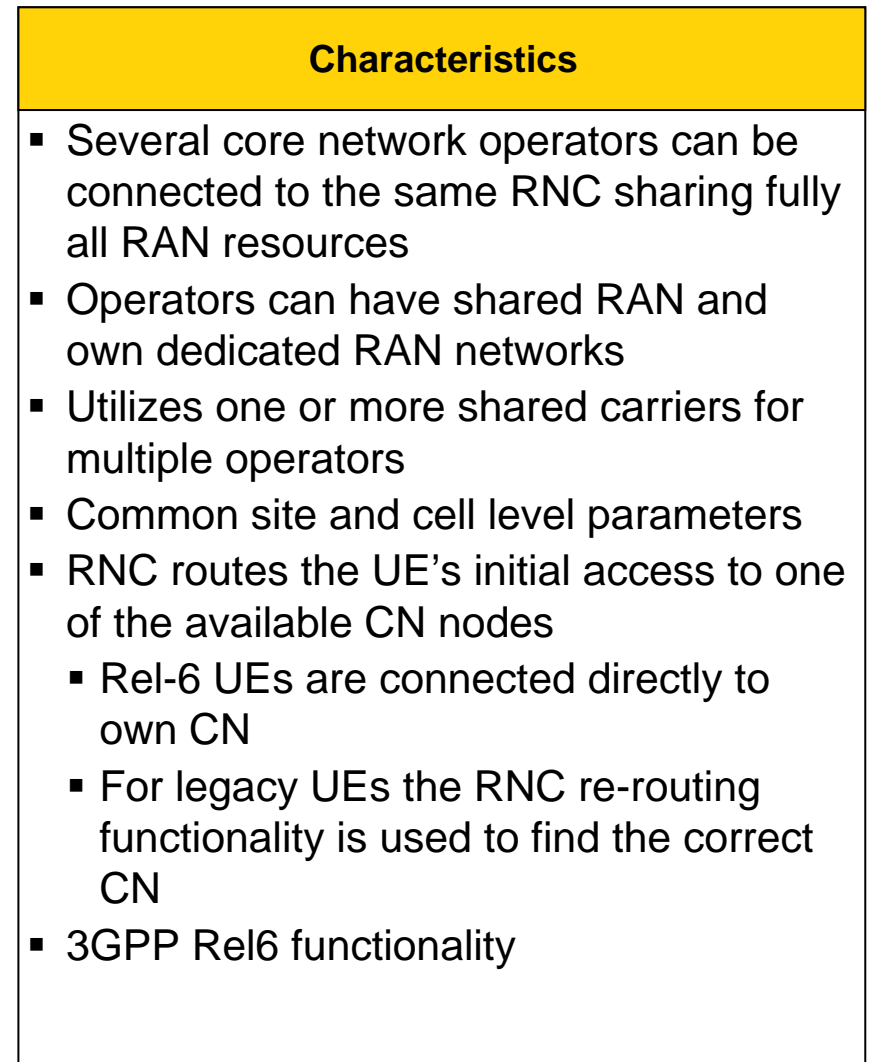
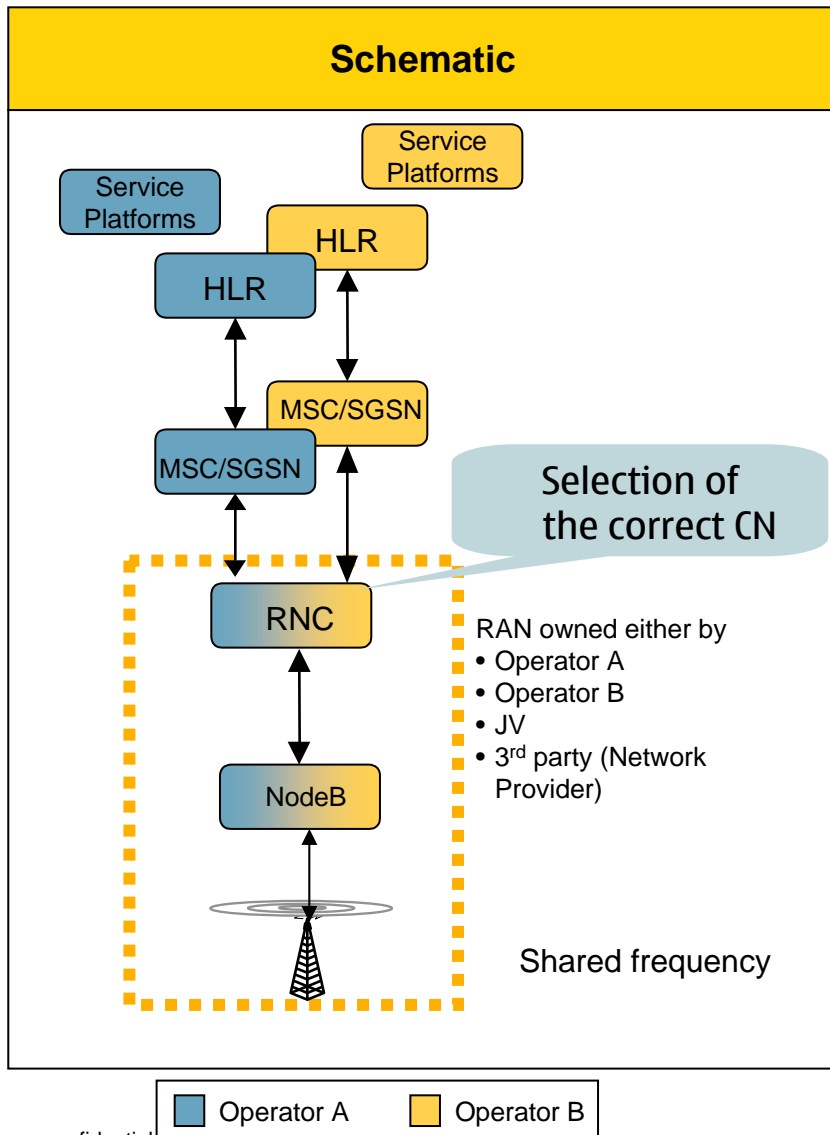
Cons

- Minimum joint configuration is 2 carriers
- Application SW in radio needs to be jointly agreed
- Part of the radio parameters need to be common
- Certain capacity upgrades still need to be jointly coordinated / costs agreed



Active RAN Sharing

Scenario: 3G Multi Operator Core Network (3GPP MOCN)



MOCN; Independent Core NW, Fully Shared Radio

Pros

- Significant reduction in equipment volume in low traffic areas (1+1+1 config possible)
- 100% increased rollout speed with given cost
- Reduced network and site operating costs
- In low traffic areas long term cost advantage
- Operators name visible on phone display (SIM based solution for 3GPP rel5 and older terminals)
- Independent CN services

Cons

- Regulator acceptance for spectrum sharing required
- Shared radio resource; increased traffic for one is increased blocking for other
- No differentiation in radio features
- QoS strategies for data users difficult to use
- Sharing partners need to coordinate
 - all RAN-related operational aspects
 - RAN planning aspects
- SIM based Operator logo solution required for rel5 and older terminals
- Handovers possible to other operator's network within a shared RAN

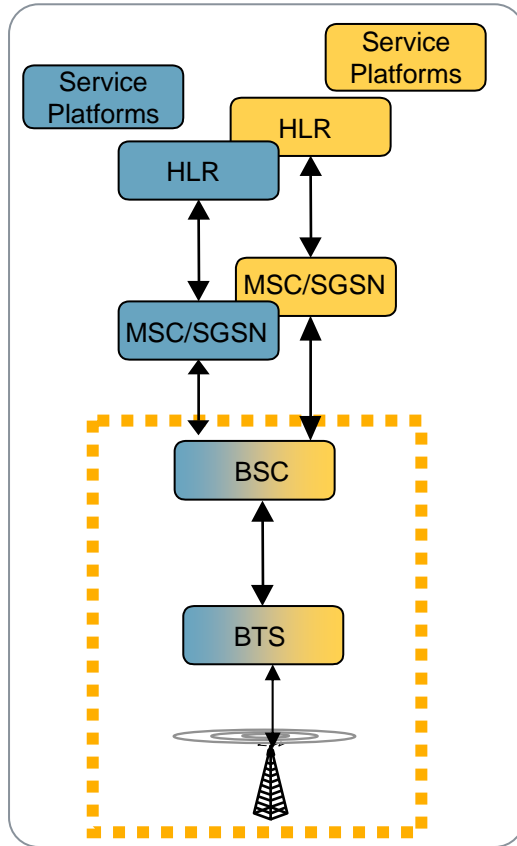


Sharing solutions for every Radio Access Technology ...

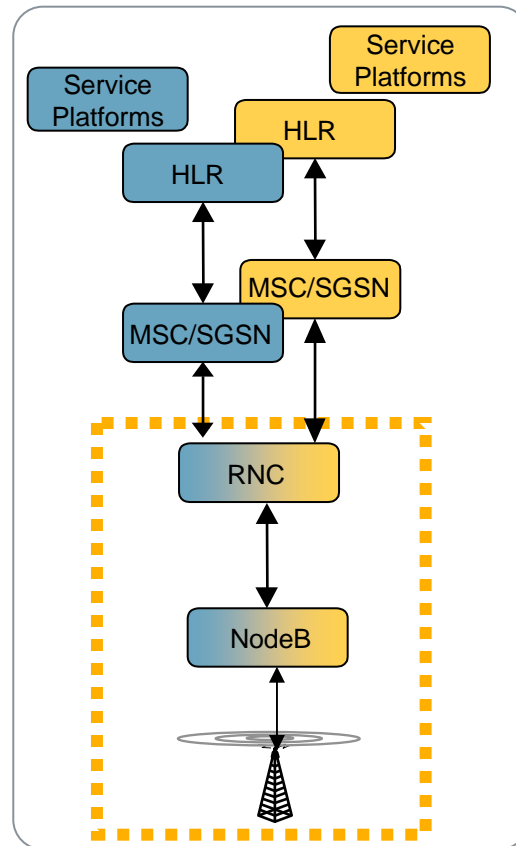
2G

3G

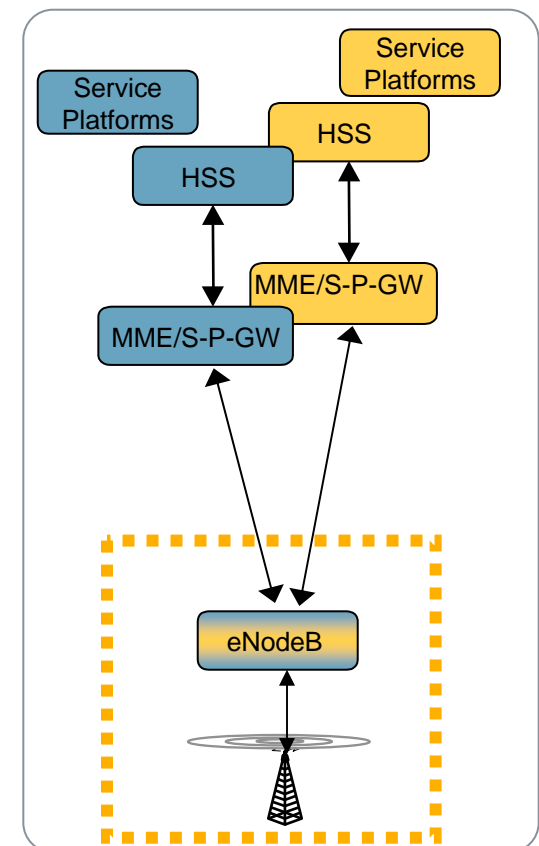
LTE



MOBSS for GSM/EDGE



MORAN for WCDMA/HSPA



MOCN for LTE

Given the financial benefits, why has Network Sharing not taken off more extensively until now ?

Why Share ?

For strategic reasons, the loss of independence and decision making outweigh the financial benefits for many CSPs; the need for sharing may therefore not be compelling enough

Whom to Share with ?

Partner selection

As with marriage, finding the right partner is quite difficult !

- Finding a partner with a similar competitive position and strategic objectives
- Lack of trust & cultural mismatch, with no neutral 3rd Party to facilitate and play an active role to bridge the differences

How to Share ?

Implementation

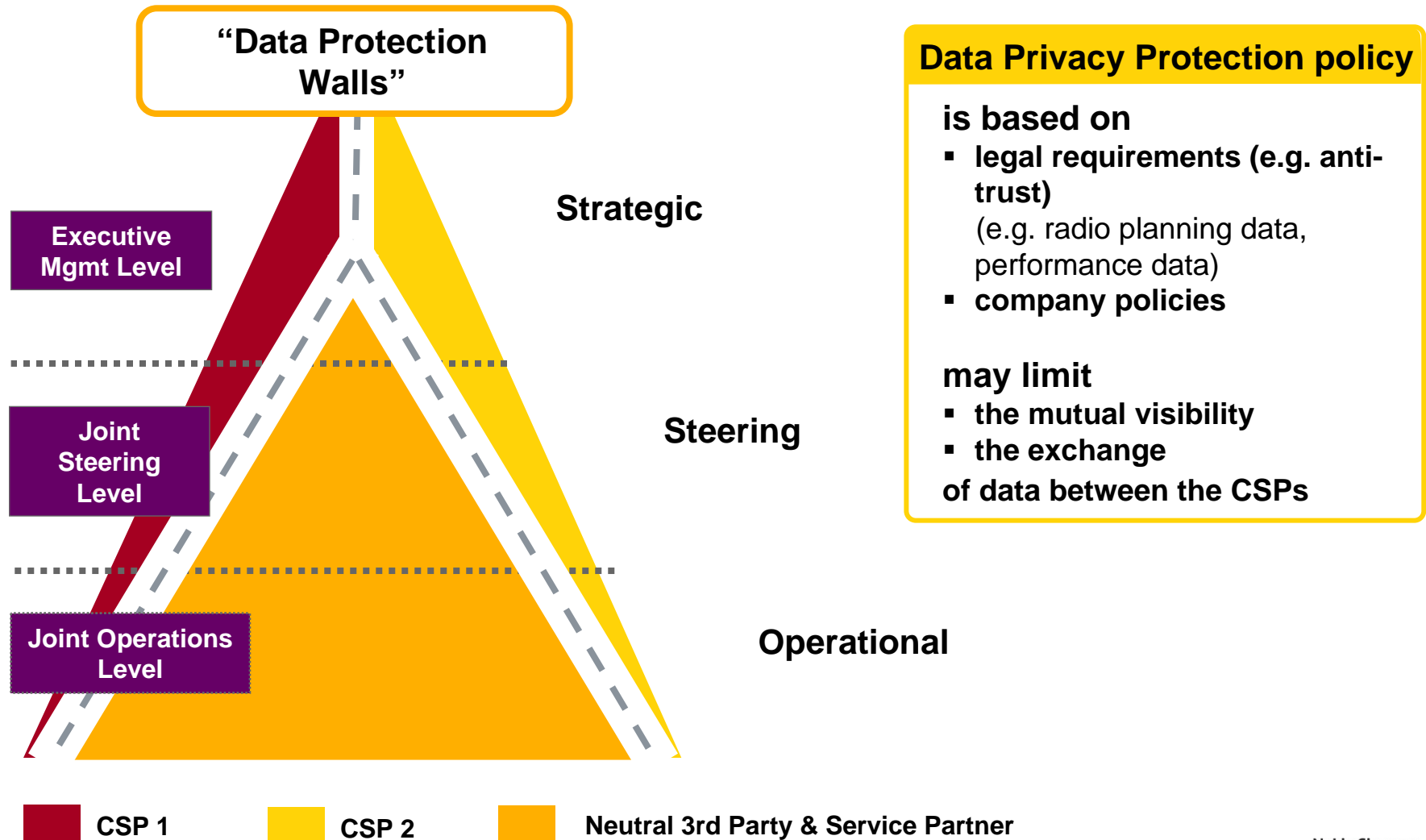
Implementing an agreement is much more difficult than writing one !

- Difficulties in aligning parent's different strategies & goals
- Difficulties in agreeing on common staffing, investments and vendor strategy
- No equal commitment, loyalties more towards parent companies instead of to the JV and its goals
- Operations challenges, requiring experience in transformation and change management as well as adaptation to different Governance

Given the developments in the market, the willingness to share may increase rapidly, while learning to overcome the difficulties.
Key is a Service Partner, who as neutral and trusted 3rd Party has the experience in design, build & operate networks and can deliver the benefits

A neutral 3rd Party is key to implement the Governance Model with Data Privacy Protection

...



... leading to some major Network Sharing Projects Worldwide

Country	Operators	Sharing Method	Operations Mode
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Sweden:	Operator A & B		
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		MOCN	
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			JV
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Sweden:	Operator C & D		
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		MOCN	
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			JV
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Spain:	Operator A & B		
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		MORAN	
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			Split Operation
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UK:	Operator A & B		
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		MORAN	
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			JV
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Canada:	Operator A & B		
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		MOCN	
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			Split Operation
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Australia:	Operator A & B		
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		MORAN	
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			Split Operation
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Australia:	Operator C & D		
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		MOCN	
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			Managed Services by 3rd party
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Network sharing – the voices of Operator

“We are now moving ahead with the **large scale consolidation of cell sites**. A key objective was to ensure that we achieve scale and integrate quickly and smoothly, **minimizing costs** whilst quickly expanding coverage so as to enable a much improved service experience for our growing number of mobile internet and broadband customers.

Technology Director at UK Operator

“High-speed mobile broadband is going to be a key enabler for both consumers and businesses looking for convenient access to Internet-based services wherever they are. This **innovative network collaboration agreement** will help to accelerate the adoption of new services in a **timescale each of us could not have achieved on our own**. It also enables us to **cost effectively** meet customer demand for wider coverage, faster speeds and greater capacity that is starting to arise as mobile devices become the most cost-effective and convenient route to access the Internet.”

Chief Technology Officer for UK Operator

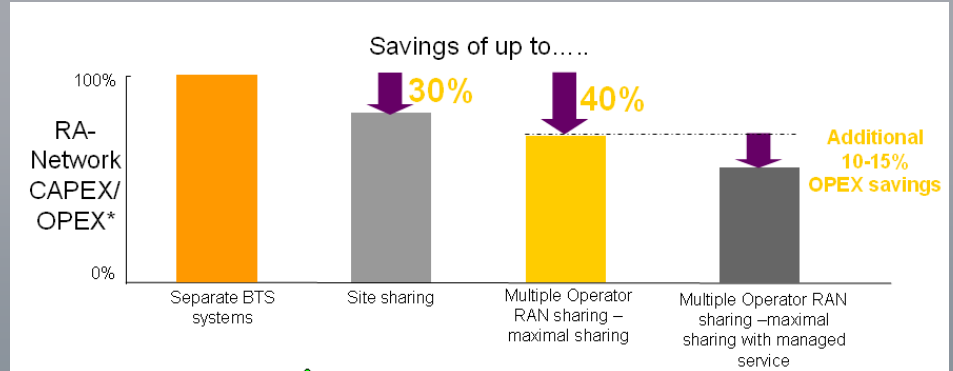


Summary

Summary - why Network Sharing !

Operators facing costs of managing existing networks and the roll-out of new technologies.

How to minimize the investment cost and maximize the shareholder value



Still Some Challenges to overcome

- What to share
- Whom to share with
- Where to share
- How to share
- What is the right business model

Managed services for maximum OPEX savings

Various network sharing methods for 2G, 3G and LTE

- from simple site sharing to the fully managed network
- MORAN for RN controlled sharing is a field-proven method
- MOCN for RN controlled sharing fully standardized already in the initial LTE-standard (3GPP Rel.8)



Thank you !

