



# Wireless Network Virtualization: Opportunities for Spectrum Sharing in the 3.5 GHz Band

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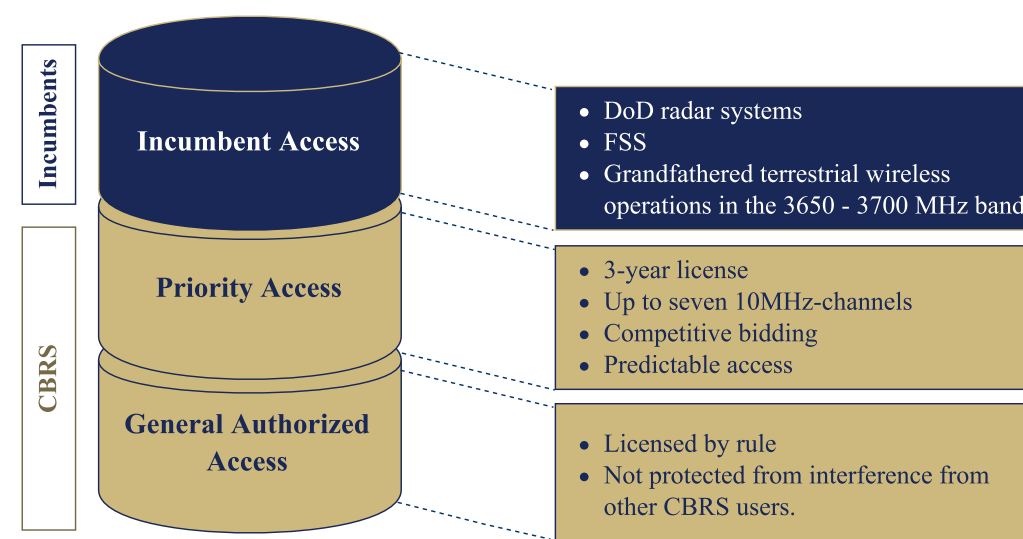
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Creating a comprehensive framework for the deployment of spectrum sharing environments where virtualization is applied

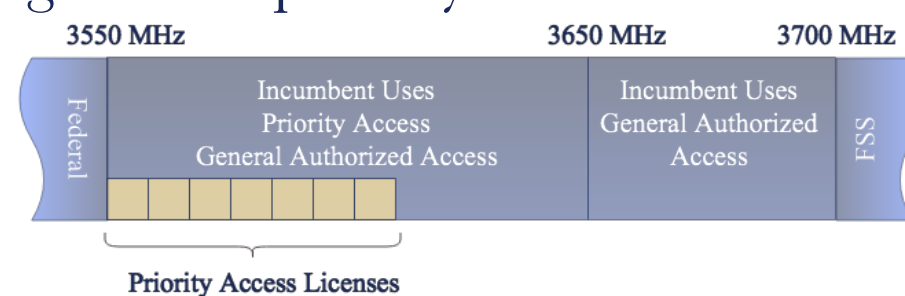
## Regulation

Regulatory Flexibility Framework established by the FCC

- Three tiers of users were defined for shared operations



- Users have access to different portions of the band according to their priority



- The Spectrum Access System (SAS) will be in charge of an automated frequency assignment process

## Technology

Technical enabler of regulatory flexibility:

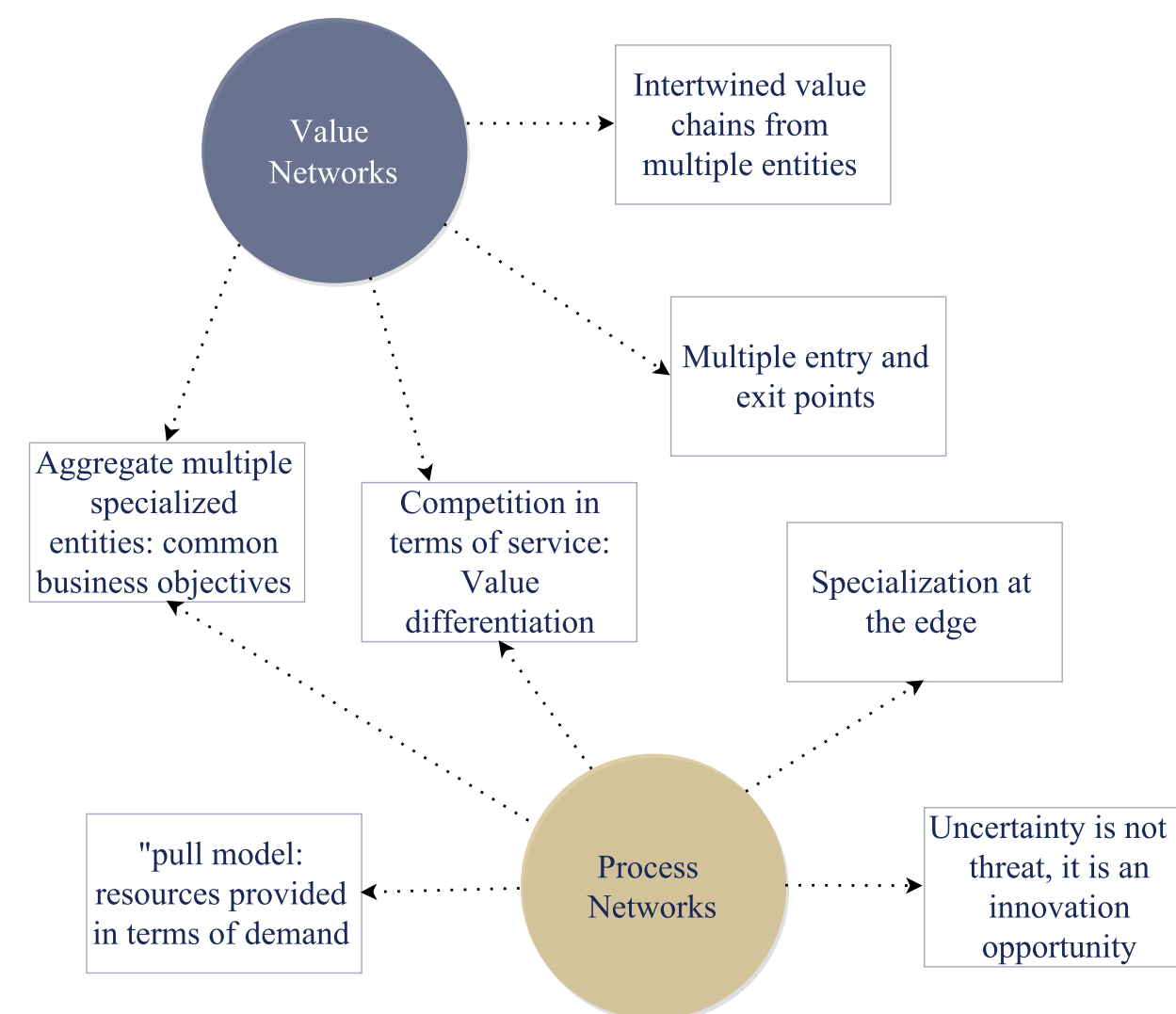
- **Wireless Network Virtualization:** partitioning, combination, slicing and abstraction of resources to create virtual (wireless) network instances
- Our focus: **Resource Pooling**

### Opportunities:

- Find improved alternatives for resource use, sharing and assignment
- Create multiple virtual networks, serving specific purposes using distinct technologies
- Make network changes while minimizing costs

## Economics

### Process Networks and Value Networks



### Facility-based vs. Service-based Competition

In a virtualized environment, we expect service-based competition to prevail

- Supported (and encouraged) by the adoption of process and value networks

### Spectrum Value

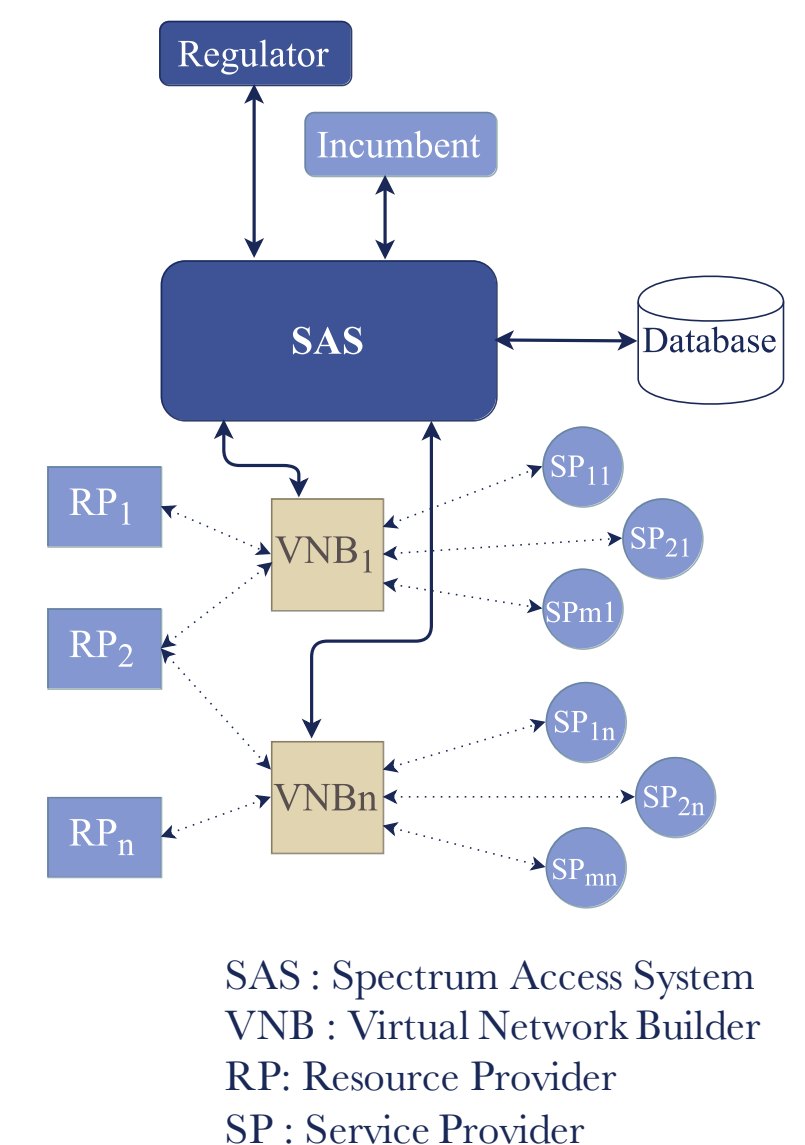
Defined by the services deployed using spectrum  
Varies according to:

- Spectrum license characteristics
- Service demand
- Innovation and technological changes

Valuation guides the operators' willingness to pay for spectrum access

## Sharing Opportunities

- Local approach: Enhanced (simple) sharing scenarios
- Generalized approach: Added network flexibility and increased opportunities for new entrants
- Task redistribution among network entities
- New business models focused on specialization and sharing
- New methods to deal with uncertainty and preserve incentives
- Sharing process becomes *transparent* to RPs and SPs



## Where are we heading next?

We presented a **comprehensive framework** for developing novel sharing opportunities through Wireless Network Virtualization

Our future work:

- Exploring social and governance approaches
- Improving our previous spectrum trading model

Scan the QR code for a complete version of this paper

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