

Thoughts on Functional Requirements, Usage and Enforcement for 3.5GHz Spectrum Access System

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3.5 GHz and operator network considerations

Multitude Of use cases

- Small cells
- Heterogeneous access
- Backhaul

Multitude Of vendors

- Multi-vendor aspects
- Standards compliancy
- Functional parity

Multitude of protection mechanisms

- Different use cases require different approaches
- Different actions can achieve the same result

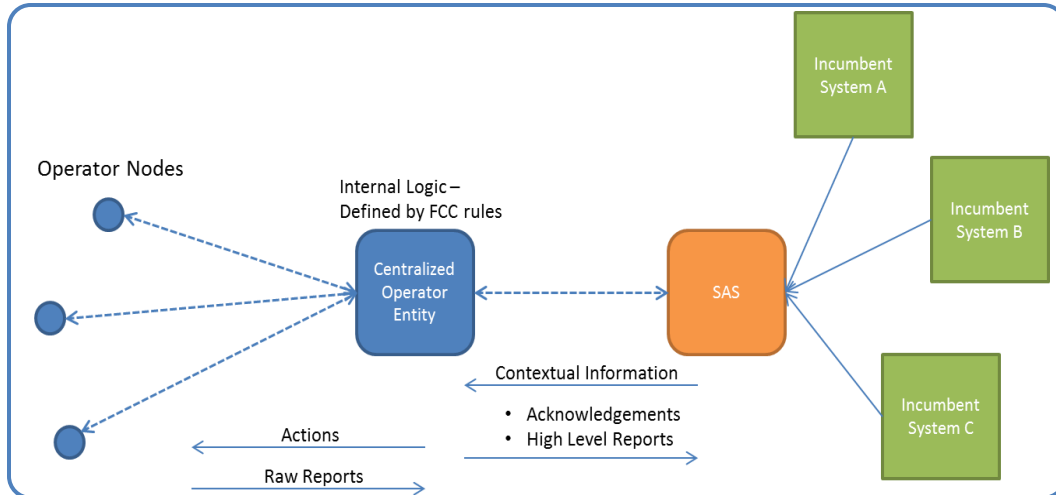
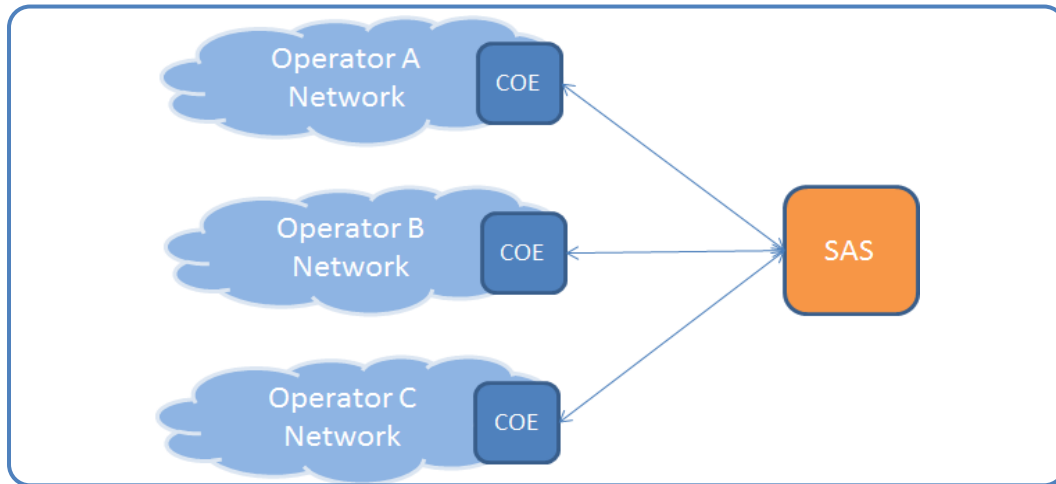
Network operations

- Service continuity
- Usability of spectrum
- Variable network operations

Need for simplified system architecture;

- leverage existing technologies “as is”
- Clear establishment of boundaries between the SAS and operator network
- Manageable information exchange

System Architecture



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- SAS System interacts with multiple operator networks using standard interface
 - E.g. HTTP based
- Centralized Operator Entity (COE) provides the interface towards SAS
- COE 'hides' network complexity from SAS and decides on appropriate measures to provide interference protection
- COE can be implemented in multiple ways, but the interface and the functional requirements are standardized

Advantages of proposed System Architecture

- **Light weight SAS deployment** – enables a centralized deployment of the SAS instead of distributed, since it only needs to communicate with one element in the operator network.
- **Simplified interfaces** – only one entity in the operator network will be responsible for compliance for all network elements with the requirements set by the SAS, which will facilitate the interference protection of incumbent users
- **Simplified control** – only one entity in the operator network is responsible for enforcing the rules dictated by the FCC, making the interface between SAS and the mobile network more efficient and producing a greater likelihood of compliancy.
- **Ability to perform complex operations** – a centralized entity can combine input from multiple data elements and provide meaningful information about the network.
- **Support a phased deployment**, with simpler rules first and more complex rules possible as the system evolves.

Governance and evolution aspects

- **The interface and the functionality between SAS and the operator network needs to be standardized**
 - Need for governance around functionality, validation and evolution
 - Industry best practices, e.g. around standardizations and interoperability testing should be utilized
- **‘How do you eat an elephant?’ – ‘One Bite at a Time’**
 - Evolution of the system should be phased
 - Avoid over-engineering and unnecessary requirements
- **Clear interference mechanism criteria**
 - As long as you know the goal, you can get there