SOFTWARE RADIO

Maximizing Spectrum Usage

- The Spectrum Access System should maximize spectrum utilization under the offered load, for the current case, not the worst case which is often the case with static spectrum access
- Dynamically maximize across 3 dimensions:
  - Time, Frequency and Space
- Not a database where you check in for permission, but an interactive management system

Databases & Sensing

Databases can provide global information

- e.g. locations and frequencies of existing TV stations

Sensing can provide timely local information

- What is actually in use in an area at a given time
- Not talking about DSA!!!
- Incorporating sensing data that exists today
  - Cellphone measurement reports
  - WiFi scanning

Combining database information with scanning data results in capabilities that cannot otherwise be achieved

Example: Boundary Problem

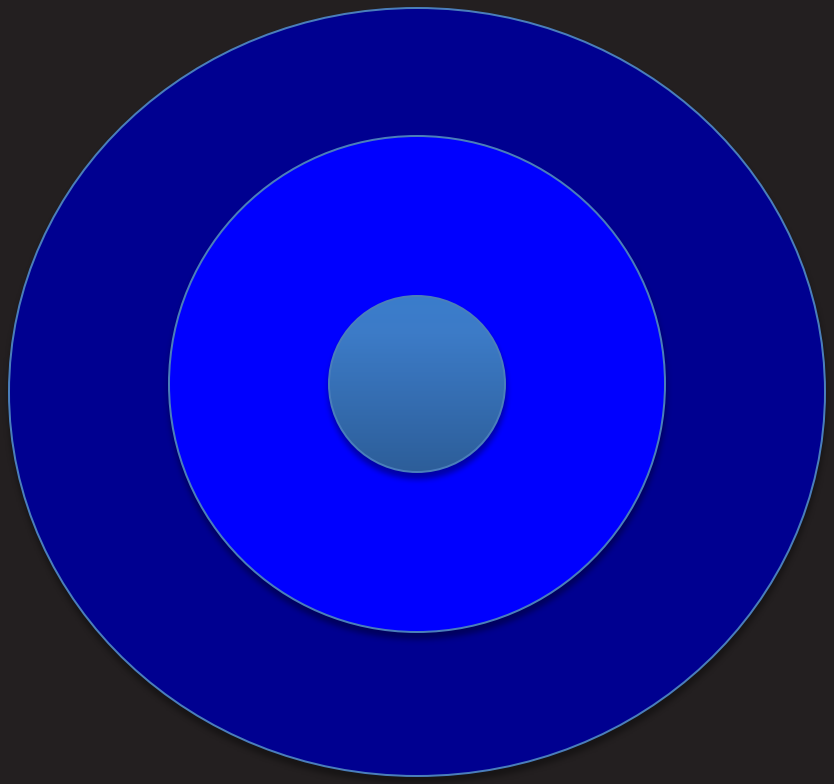
Boundary: license-by-rule indoors and geographic area licenses for outdoors

One power level for indoor is not optimal.

- A densely populated apartment building may need a low power limit
- A large corporate campus is better served with a higher power limit

Sensing data from mobiles and infrastructure in the local are can be used to adjust power levels appropriately for each area.

Better Devices Get Better Access



Default exclusion zone can be set at a safe distance

Devices can be granted smaller exclusion zones if their receivers can tolerate the interference

Self certification of devices should be sufficient

Summary

- SAS can open up entirely new ways of using and managing spectrum
- No longer do we have to consider static rules and limits
- SAS can adapt to current case, maximizing spectrum utilization at each location for each time, opening bandwidth for applications which fit well in these underutilized regions