Wireless Bandwidth Broker

Reclaiming 'Lost' Spectrum

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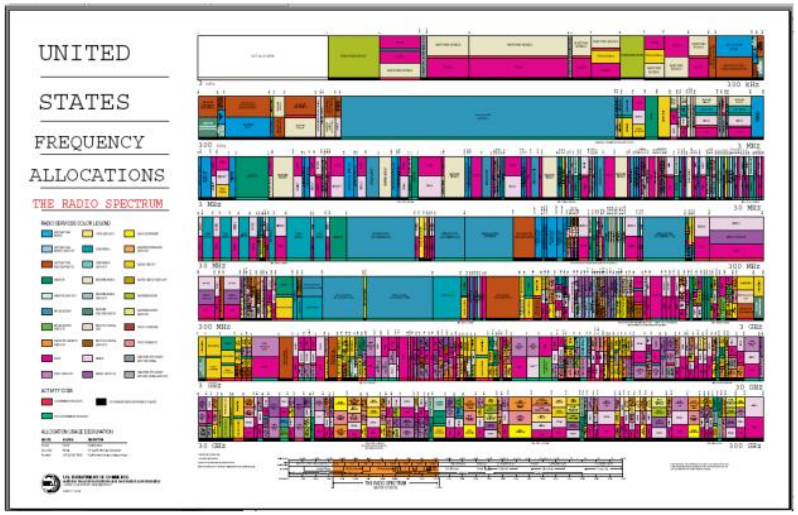
Problem Overview

- Increased Demand for Spectrum Usage
  - WLAN
  - WiMAX
  - Cellular
- FCC Findings (ET Docket 02-135, 2002)
  - Majority of Spectrum Allocated
  - Typical Usage of Allocated Spectrum is Low
  - Advocate Examination of Spectrum Sharing Concepts



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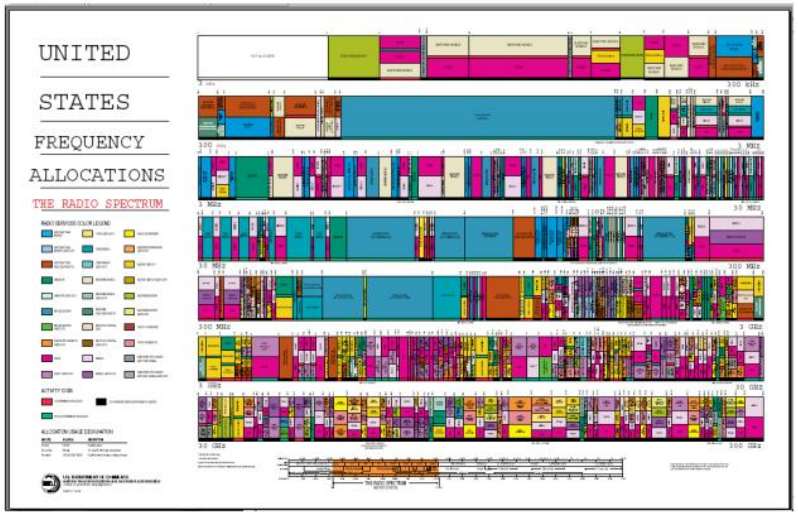
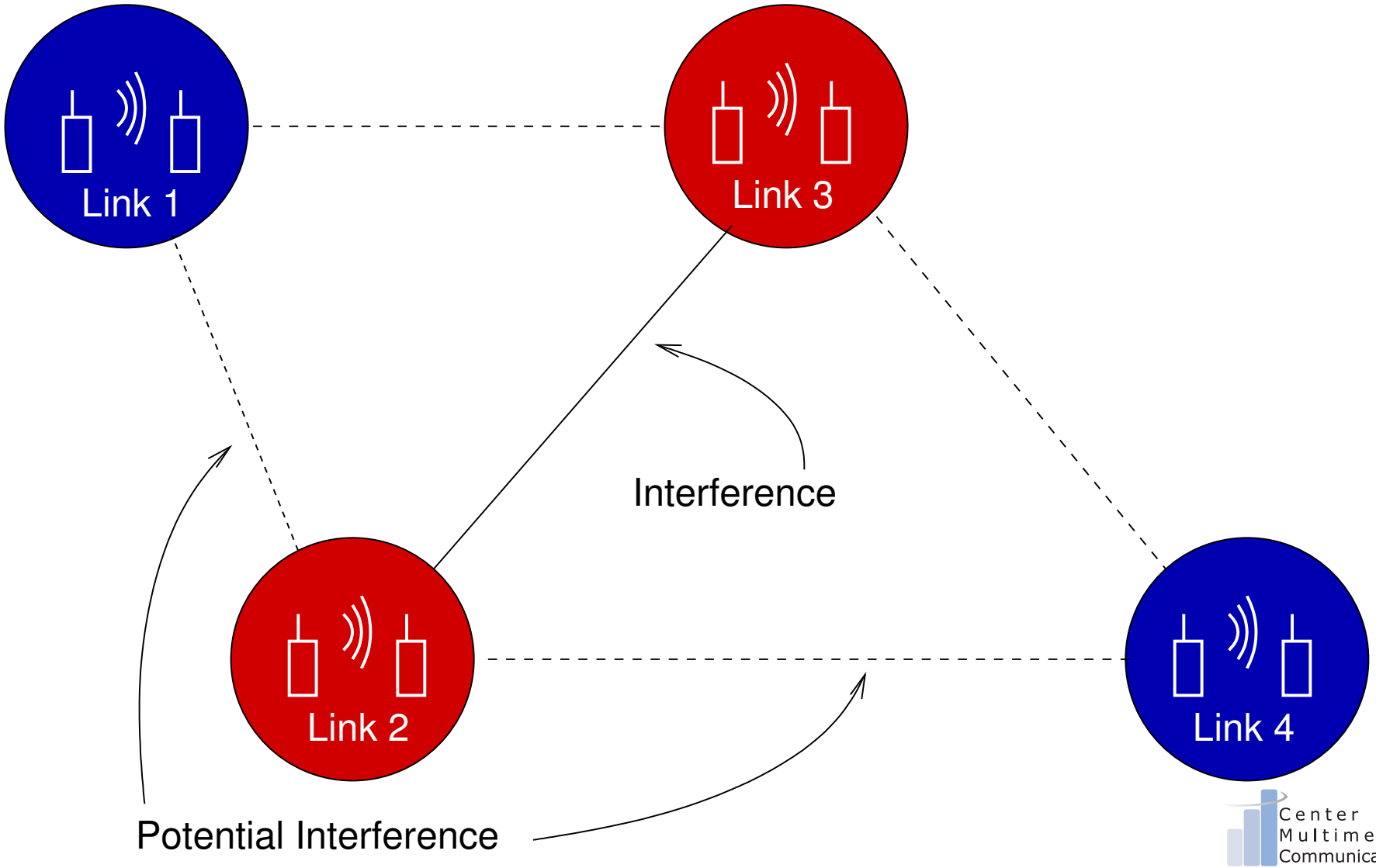


Development of a Distributed Access Protocol

Objective: Design a *distributed* algorithm to allocate orthogonal channels.

- Simpler system
- Baseline for comparison with increasingly centralized networks

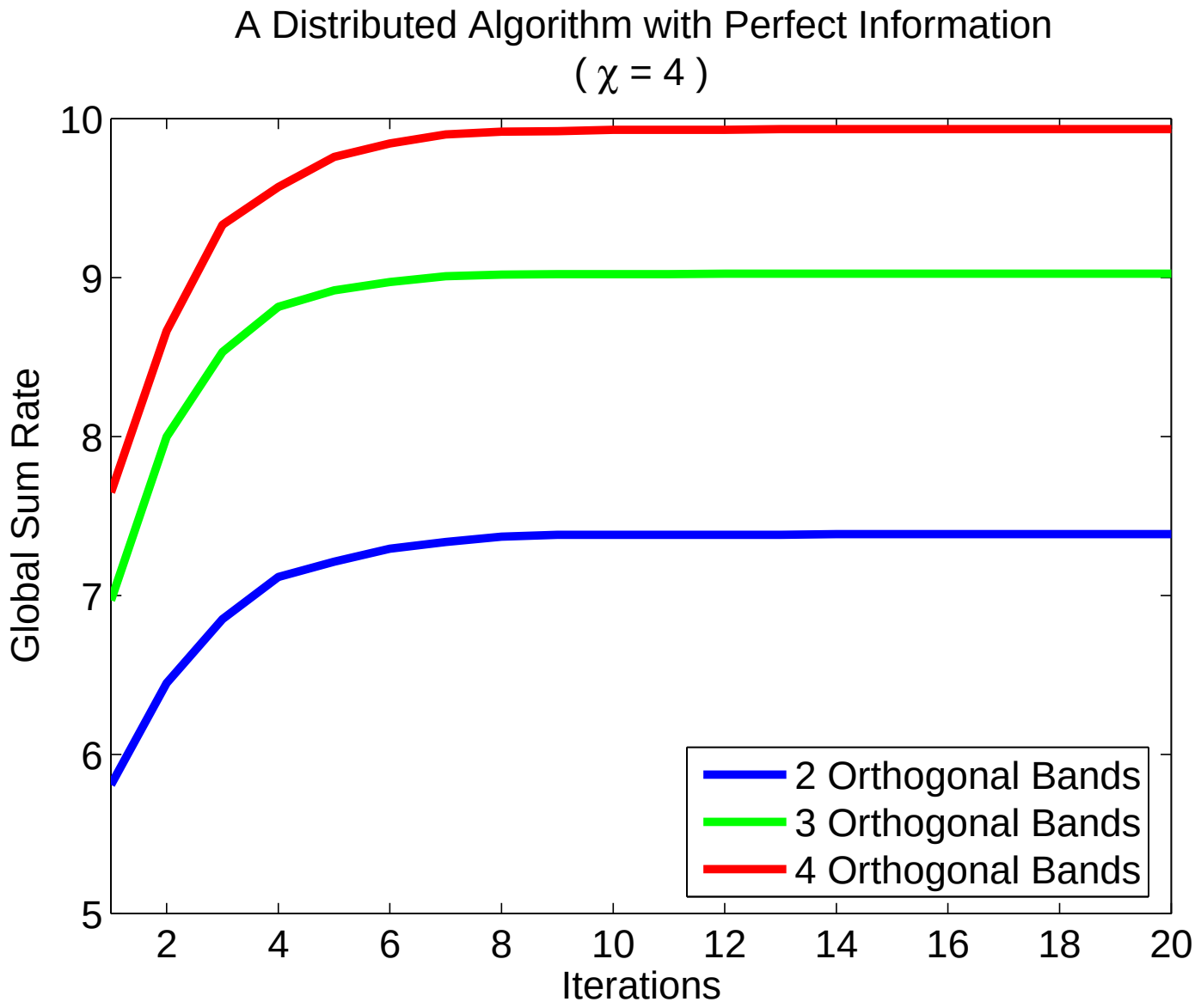
Graph Coloring



Game Theoretic Algorithm Guidelines

- Why Game Theory?
- Resulting Desirable Characteristics (Rosenthal 1973 & Selten 1975)
  - Best reply dynamic $\longrightarrow$ Iteration
  - 'Semi-sequential' structure
  - Perfect recall (inference)

Preliminary Results



Extensions and Discussion

- Independence vs. Cooperation vs. Coordination
- Dynamic Games
- WARP Implementation $\longrightarrow$ Real-Time Reconfigurability

Thank You!

Questions?