



# Design Criteria for Next Generation Network

UTC Region 9  
Technical Conference  
Newport, Oregon



# Quick Points

- Overview of the current data flows
- Central Lincoln's Net2 Deployment
  - The “Why’s and How’s”
    - What problem were we attempting to solve?
    - What can it do right now?
  - Expandability and Flexibility
    - What requirements are in the future?
  - Security = Network impacts
    - Looking downrange for system planning
- Questions and discussion





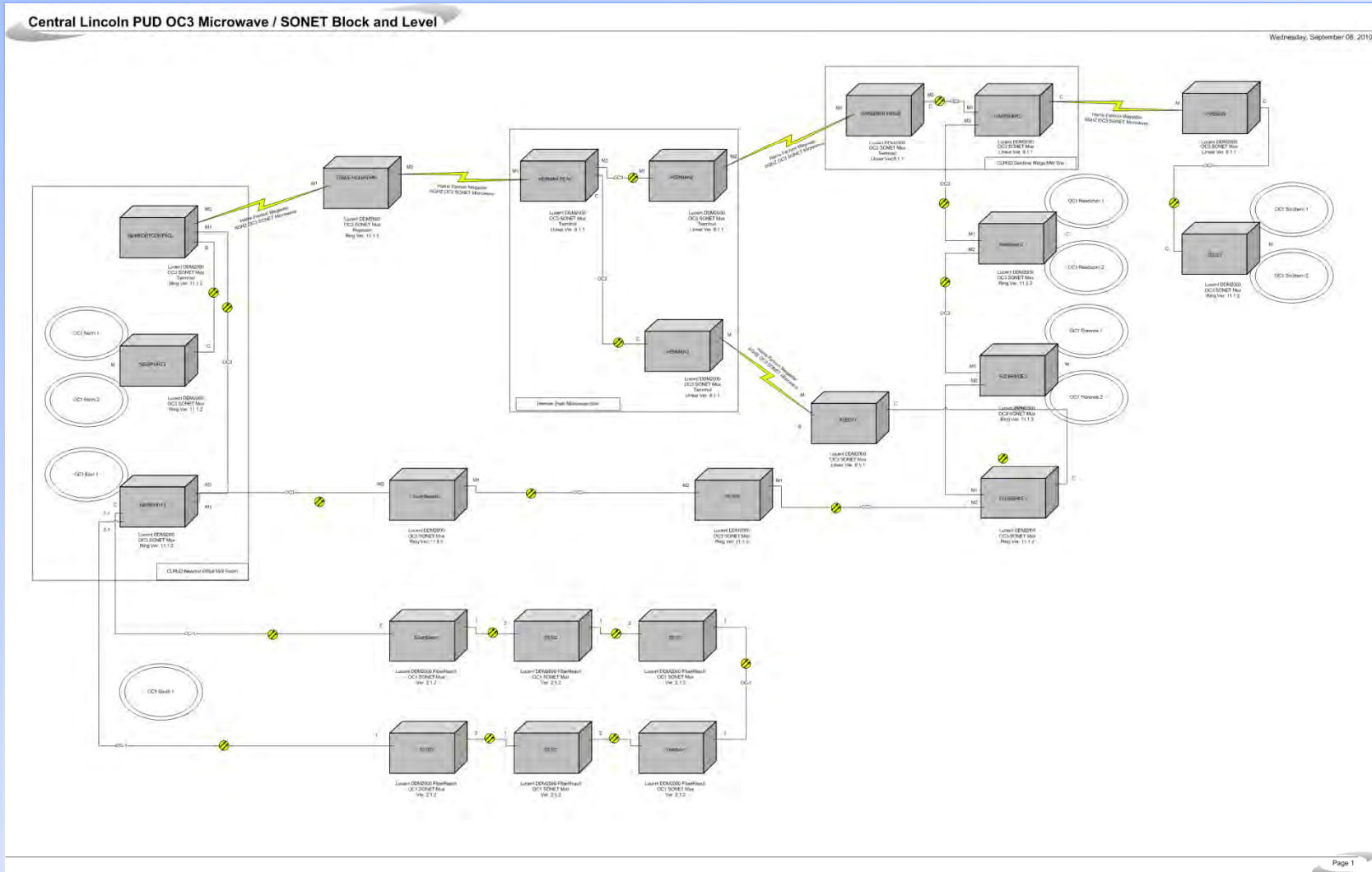
# Back in the Day

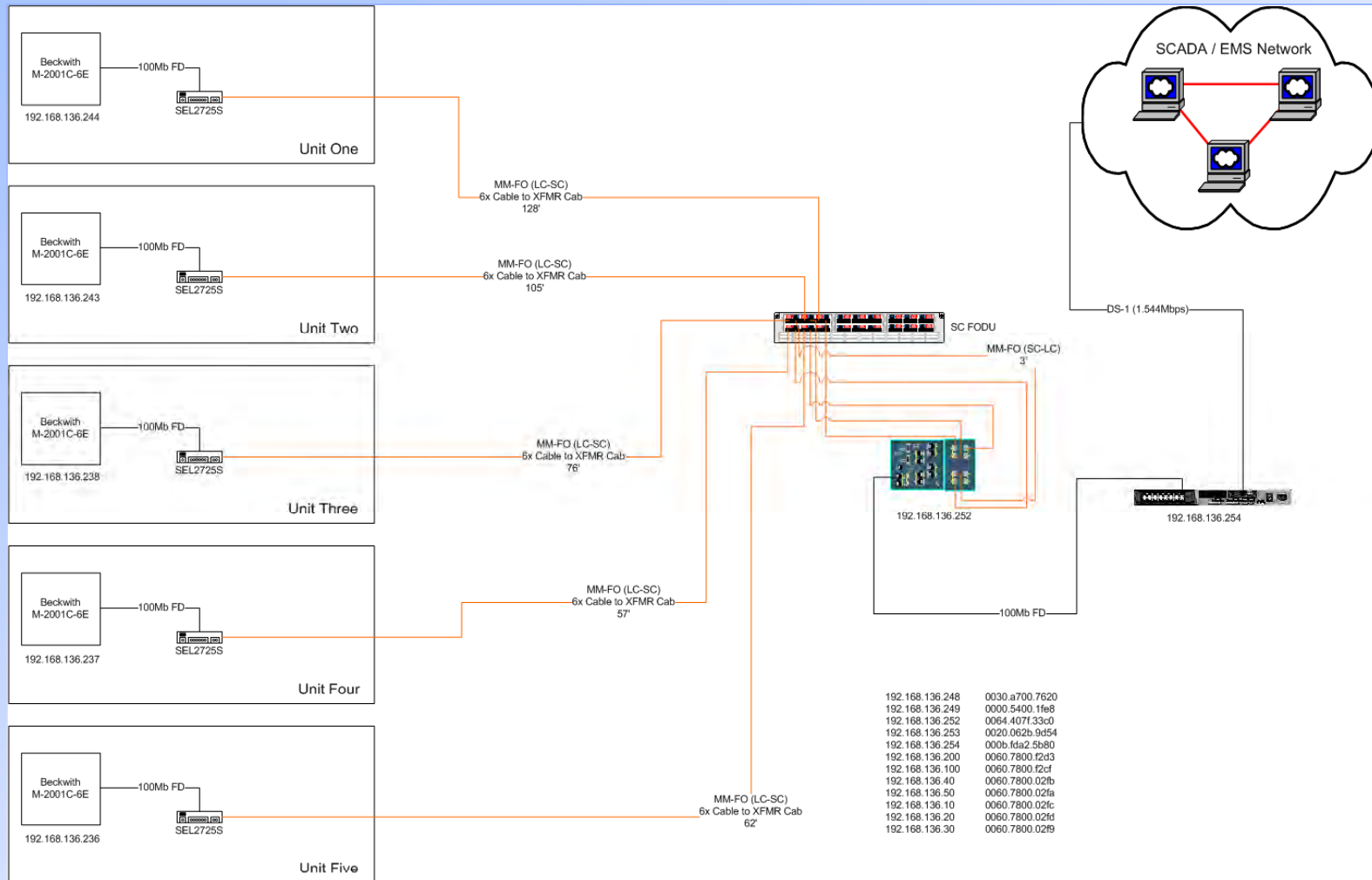
- Networks for a single purpose
  - Layers of individual networks
    - TDM-based WAN
    - IBM SNA
    - Windows – Print and file share
  - Security was “on” the endpoints
- SCADA in 1997
  - Internet Protocol as transport and client stack
  - Data stream blended with other traffic

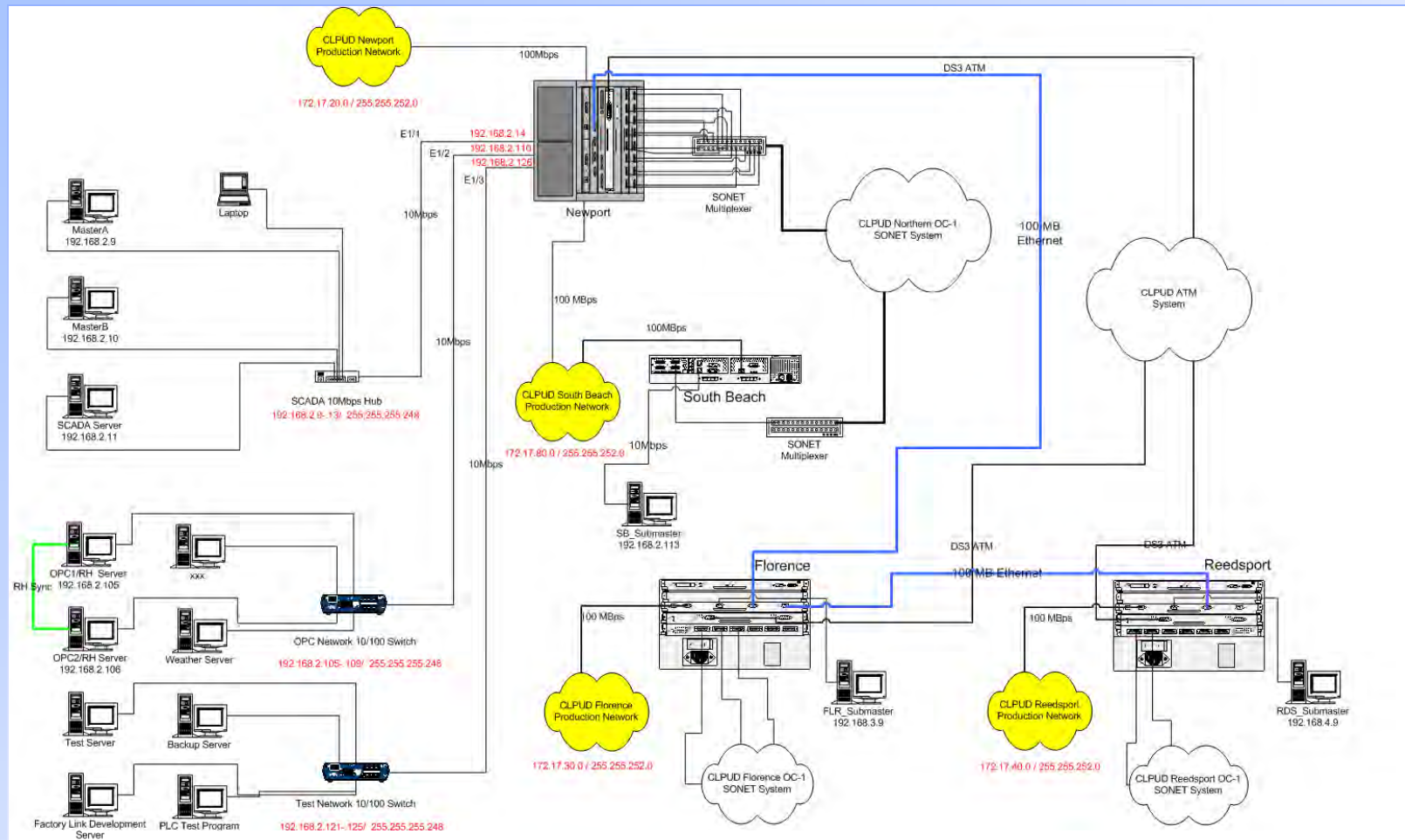


# Fast Forward

- Networks are blended
  - Layers of individual applications
  - Security is at all levels
  - Mixture of TDM and Packet technologies
  - Differing requirements and characteristics
- New IP applications
  - Internet access / Network access
  - LMRoIP – VoIP – Video – Access Control
  - AMI / DA /DR









# Design Targets

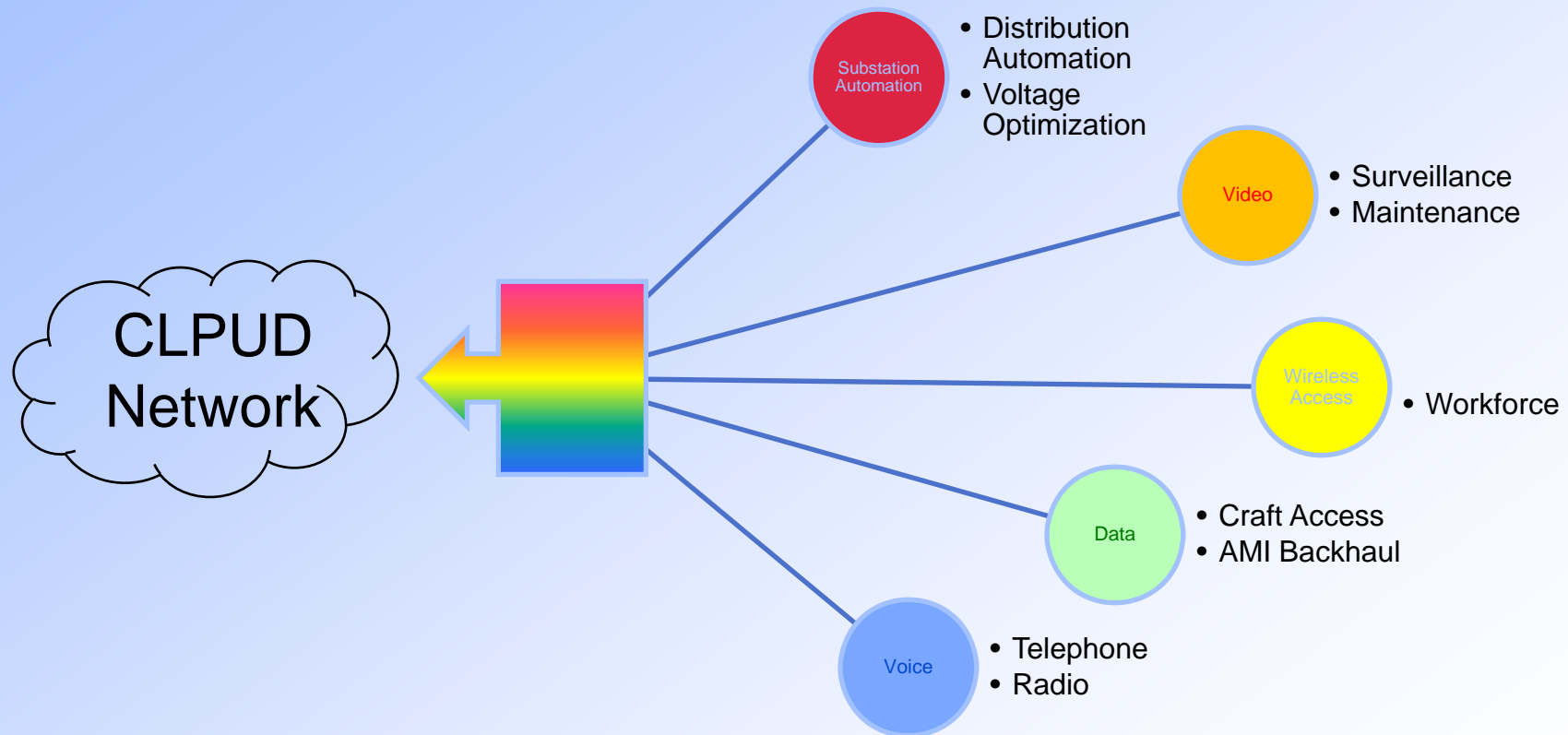
- ✓ Security
  - ✓ Resilient and available
  - ✓ Compliant and auditable
  - ✓ Flexible and usable
  - ✓ Manageable
- ✓ Transport Layers
  - ✓ Replace our SONET system
    - ✓ Modernize existing? Migrate to new system? Hybrid?
  - ✓ Internet Protocol-based
    - ✓ Experience model vs. manageability



# Design Targets

- ✓ Endpoints and Roles
  - ✓ Video Surveillance
  - ✓ Access Control and Monitoring
  - ✓ Voice and Data Access to Employees
  - ✓ SmartGrid Initiative Grant (SGIG)
- ✓ Use Cases
  - ✓ Defined and documented
  - ✓ Standards-based
- ✓ Security

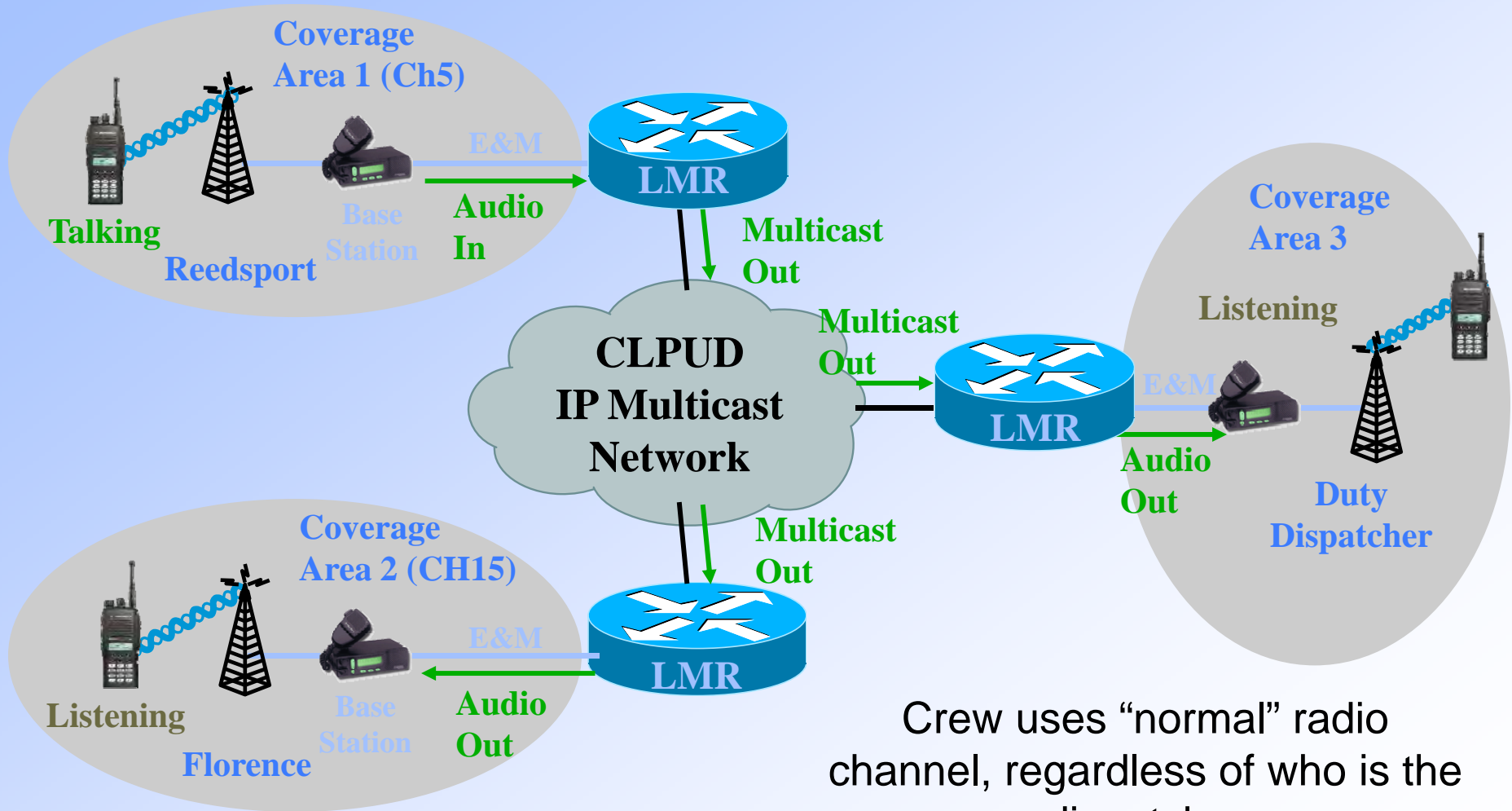
# Net2 Dataflows





# Dataflows

- Regional vs. End to End
  - SIP, RTP, QoS - CoS - ToS, Multicast RP's
- Layer 2 or Layer 3 application support
  - Quality of Service (QoS)
  - VLAN planning and management
  - IP Multicast is UDP versus TCP
- Network latency translates to application latency
  - Echo versus feedback
  - Multicast will reduce network traffic (i.e. unicast streams)

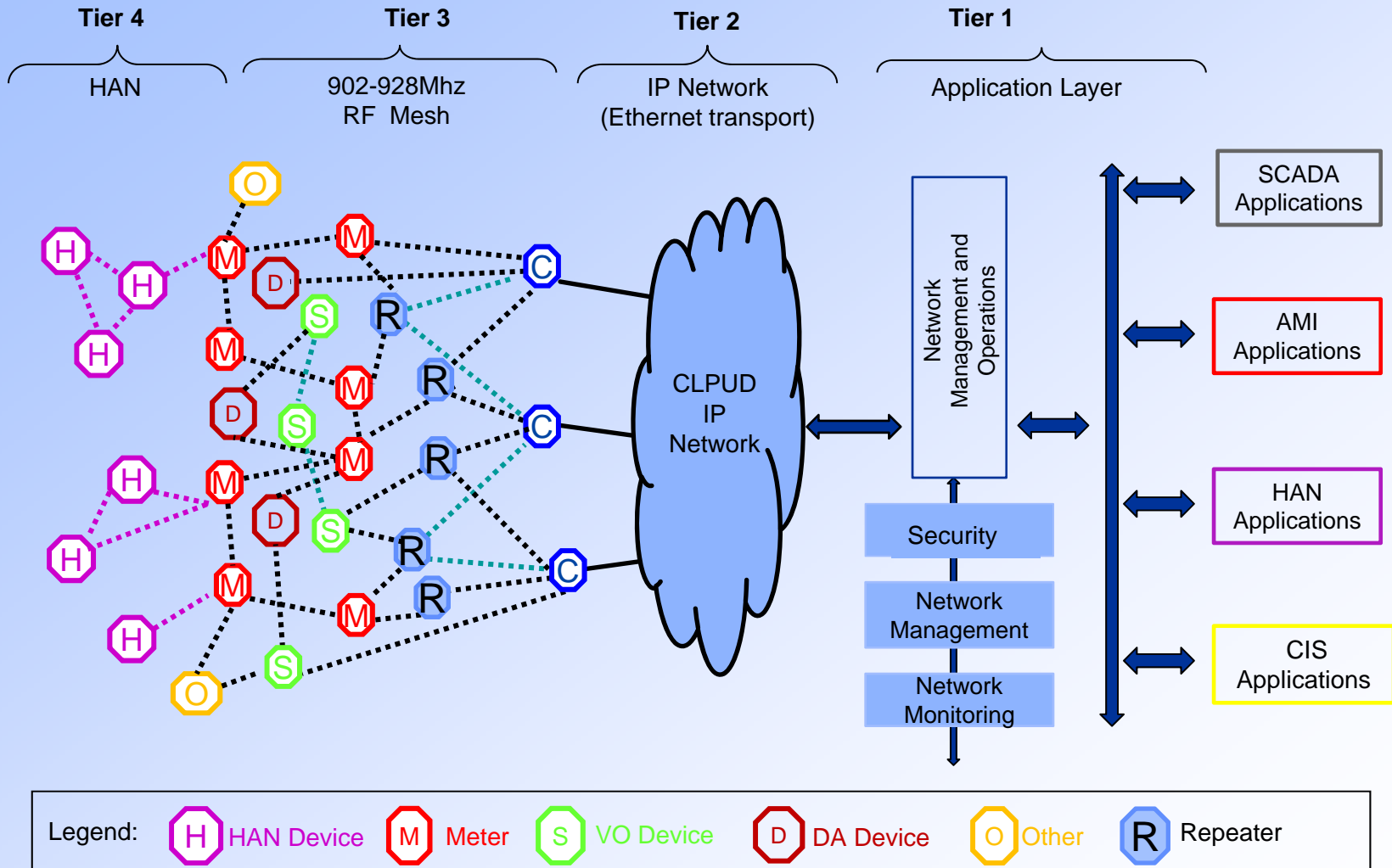


Crew uses “normal” radio channel, regardless of who is the dispatcher



# IP Multicast

- Unicast versus Multicast
  - One to One or One to Many
    - Pay-TV or “tickers”
  - TCP Unicast is Not Multicast => streams
- Key Protocols
  - Internet Group Management Protocol (IGMP)
  - Protocol Independent Multicast (PIM)
  - Real Time Protocol (RTP)
- Class “D” addressing
  - 224.0.0.0 to 239.255.255.255





# Questions?



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