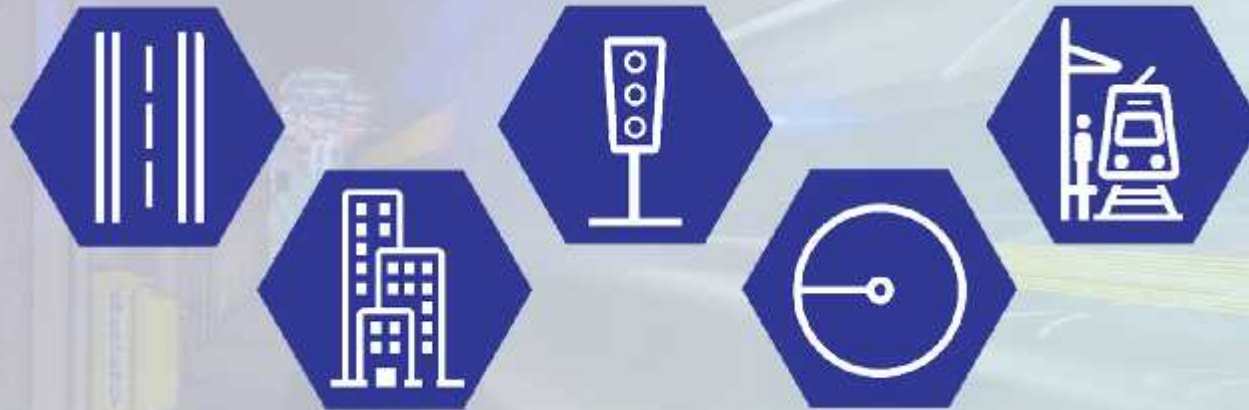




Networking for ITS



Presented by:

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BSEE, University of Idaho

20 November 2019


Multiple Challenges



Intersection Control & Monitoring



Highway Control & Monitoring



Toll Collection



Passenger Rail



Transit



New Technology

Hardened Environments.



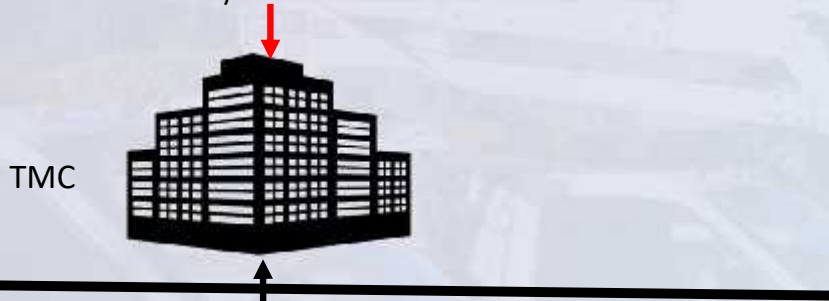
Redundancy. Scalability.



Multiple Challenges



Layer 3 Switch



TMC

Controller



Layer 2 Aggregate or Hub Switch

Surveillance



Wireless



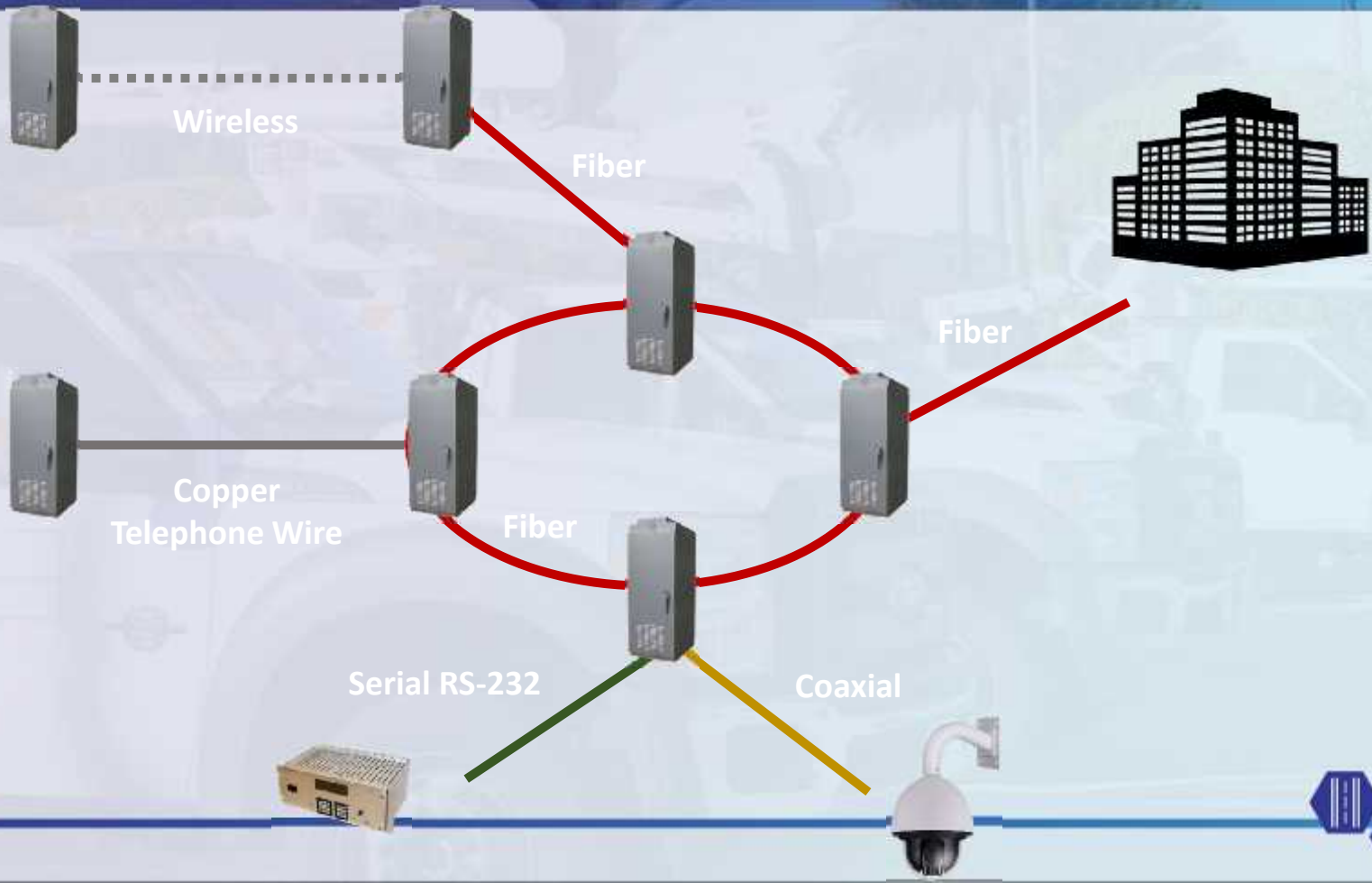
Video Detector



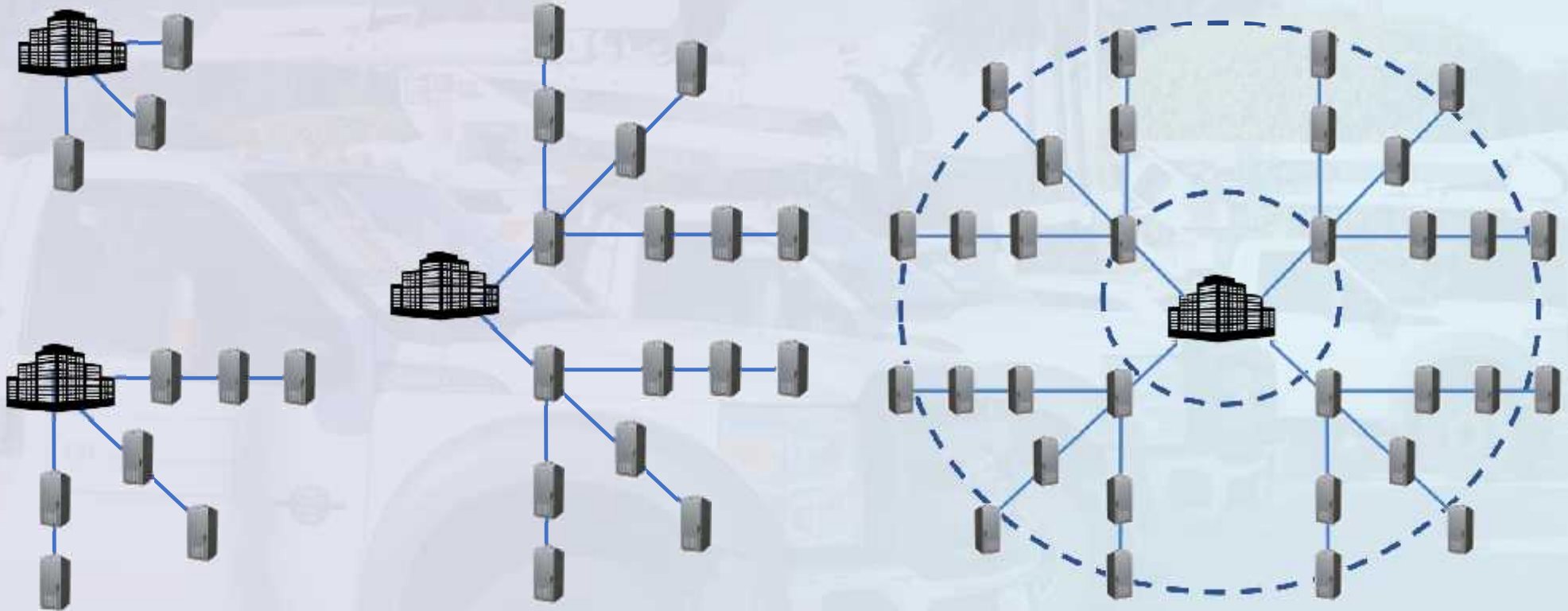
Layer 2 Intersection Switch



Convergence of Technology



Understanding Topologies



Complexity Curve

Less



What to do?



Make a Plan:

- Think Comms First
- Standardize
- Build in Reliability
- Tap into Available Resources



Standardization – Port Assignments



Camera1

Camera2

Presence Detect Cam1

VMS

Transit

Future

Wifi1/Extender1

Wifi2/Extender2

Controller

Radar_Presence

Radar_Advanced

Mgmt VLAN

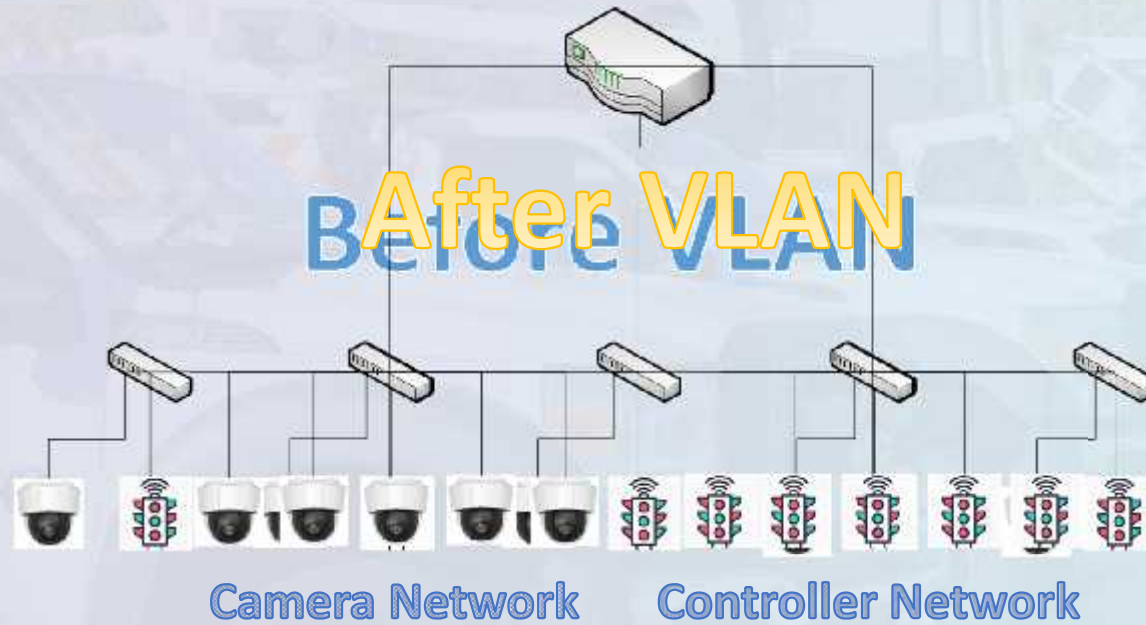
To Core/Node

To Next Switch

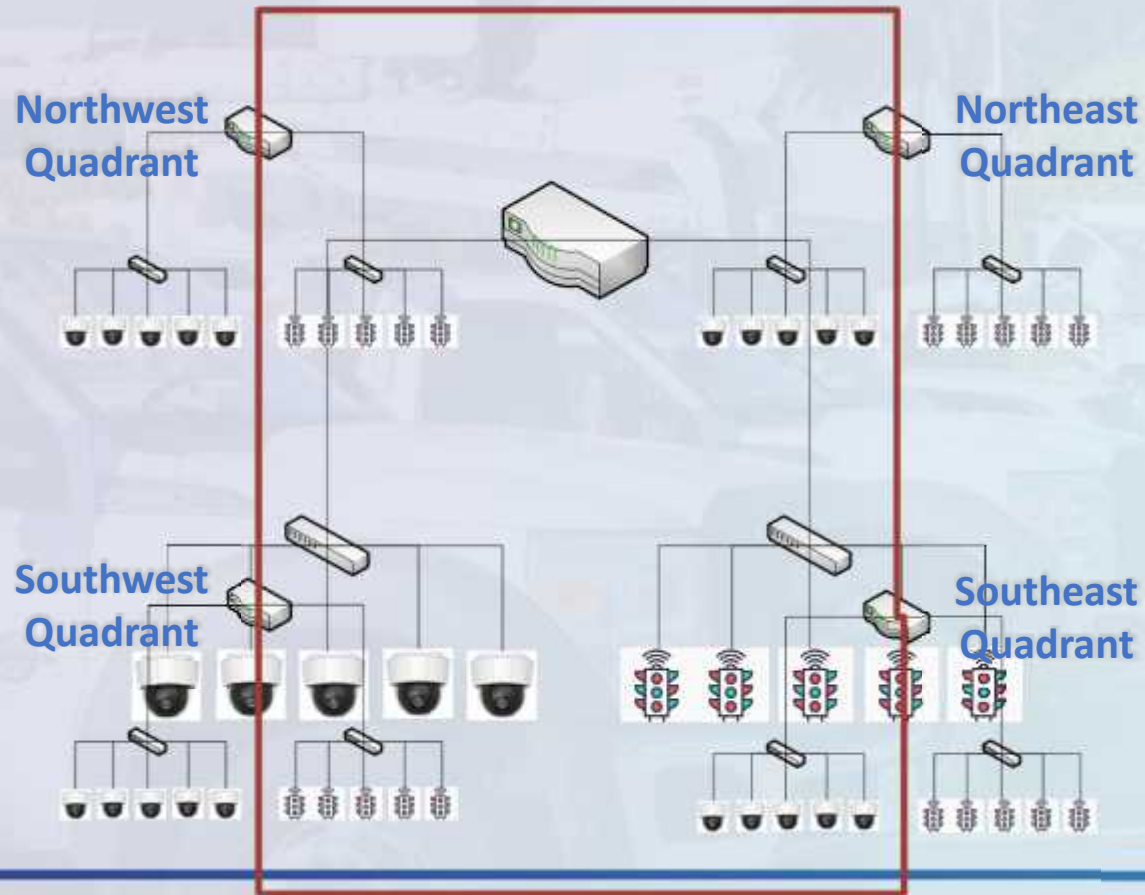
To Next Switch

To Next Switch

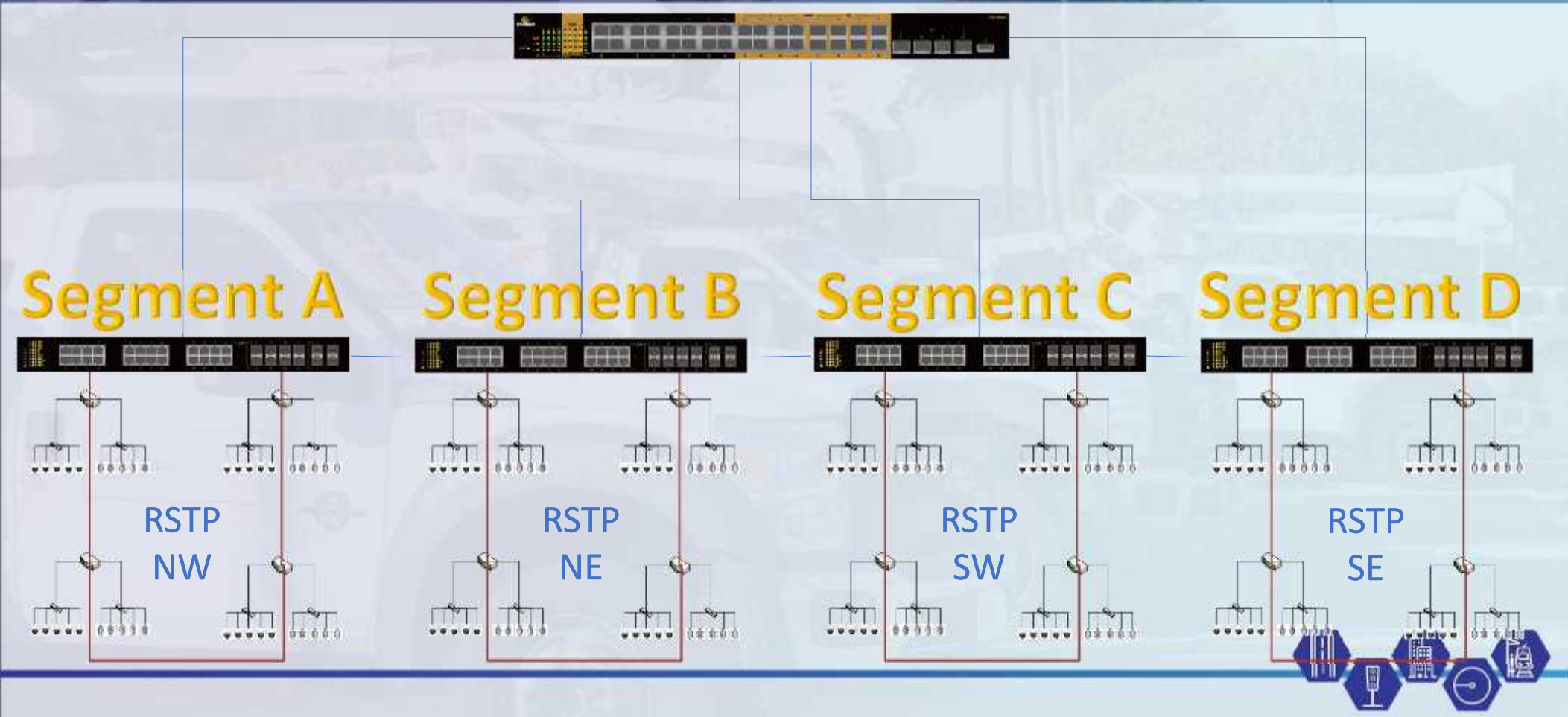




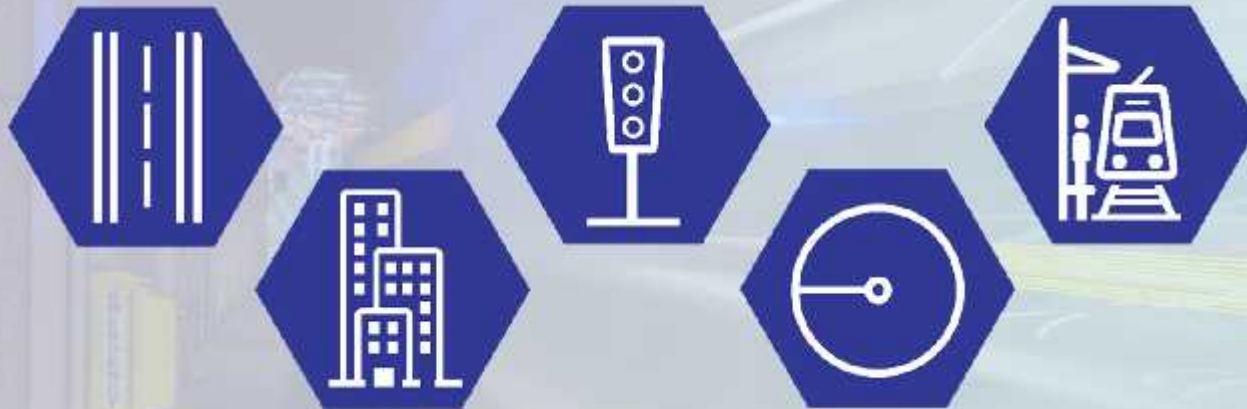
Standardization – Enables Growth



Standardization – Enables Growth



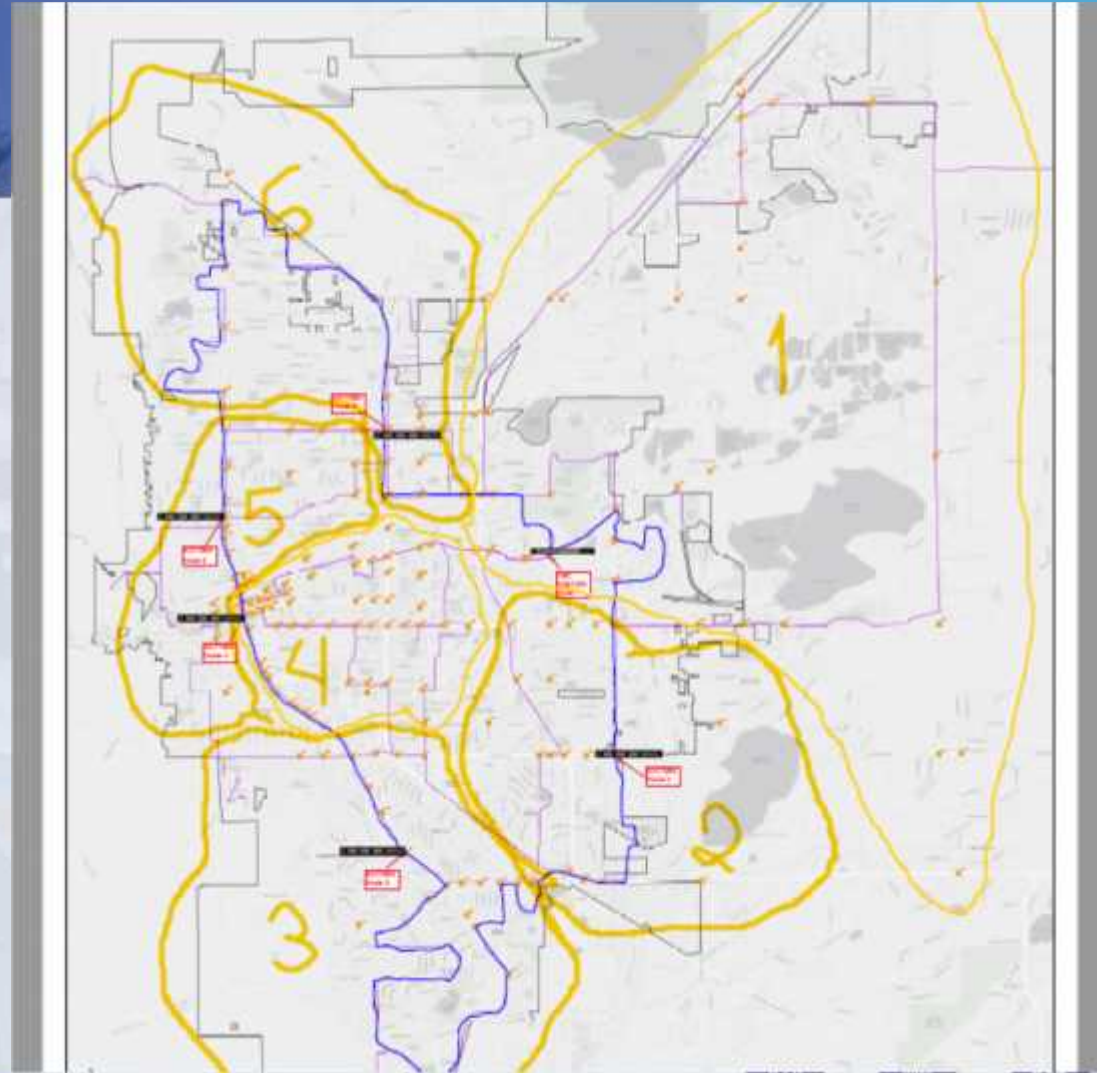
What Does This Look Like in Real Life?



Map of The City

The Plan:

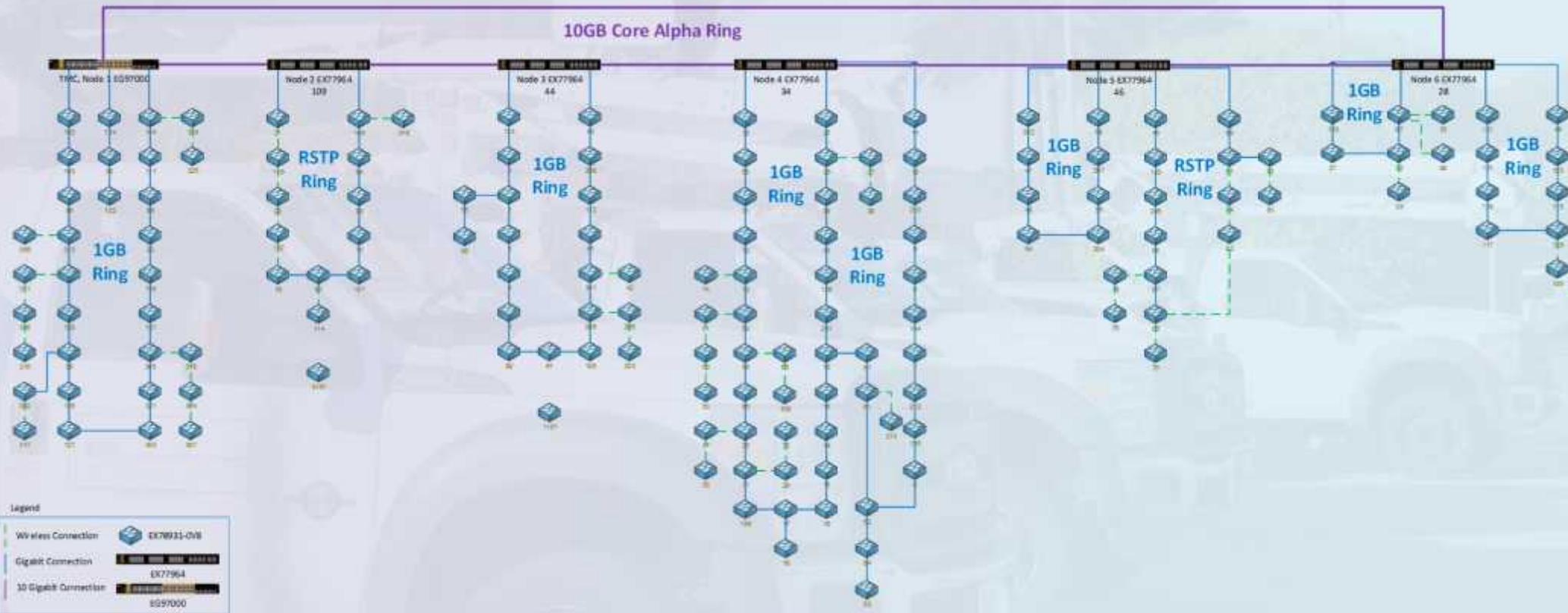
- 10Gb Fiber Backbone (20G)
- 6 Nodes Established
- TMC Node 1 – 10Gb Layer 3 (20G)
- Nodes 2-6 – 10Gb Layer 2 (20G)
- All Intersection – 1Gb Layer 2 (2G)
- Build in Reliability
- Established VLANs and IP Ranges



Note: Separate PDF File with all details included



Proposed Logical Network Design



Note: Separate Visio File with all details included



VLANs by Node



Port	Device	Node 1	Node 2	Node 3	Node 4	Node 5	Node 6
Port #1 (POE)	CCTV_CAM	10.2.1.0	10.2.2.0	10.2.3.0	10.2.4.0	10.2.5.0	10.2.6.0
Port #2 (POE)	CCTV_CAM	10.2.1.0	10.2.2.0	10.2.3.0	10.2.4.0	10.2.5.0	10.2.6.0
Port #3 (POE)	Presence_CAM	10.4.1.0	10.4.2.0	10.4.3.0	10.4.4.0	10.4.5.0	10.4.6.0
Port #4 (POE)	VMS	10.6.1.0	10.6.2.0	10.6.3.0	10.6.4.0	10.6.5.0	10.6.6.0
Port #5 (POE)	Transit	10.8.1.0	10.8.2.0	10.8.3.0	10.8.4.0	10.8.5.0	10.8.6.0
Port #6 (POE)	Future	10.10.1.0	10.10.2.0	10.10.3.0	10.10.4.0	10.10.5.0	10.10.6.0
Port #7 (POE)	Wifi	Trunk	Trunk	Trunk	Trunk	Trunk	Trunk
Port #8 (POE)	Wifi	Trunk	Trunk	Trunk	Trunk	Trunk	Trunk
Port #9	Controller	10.12.1.0	10.12.2.0	10.12.3.0	10.12.4.0	10.12.5.0	10.12.6.0
Port #10	Radar_Presence	10.14.1.0	10.14.2.0	10.14.3.0	10.14.4.0	10.14.5.0	10.14.6.0
Port #11	Radar_Advanced	10.16.1.0	10.16.2.0	10.16.3.0	10.16.4.0	10.16.5.0	10.16.6.0
Port #12	Management	10.20.1.0	10.20.2.0	10.20.3.0	10.20.4.0	10.20.5.0	10.20.6.0
SFP #1	Up Link	Trunk	Trunk	Trunk	Trunk	Trunk	Trunk
SFP #2	Down Link	Trunk	Trunk	Trunk	Trunk	Trunk	Trunk
SFP #3	Down Link	Trunk	Trunk	Trunk	Trunk	Trunk	Trunk
SFP #4	Down Link	Trunk	Trunk	Trunk	Trunk	Trunk	Trunk

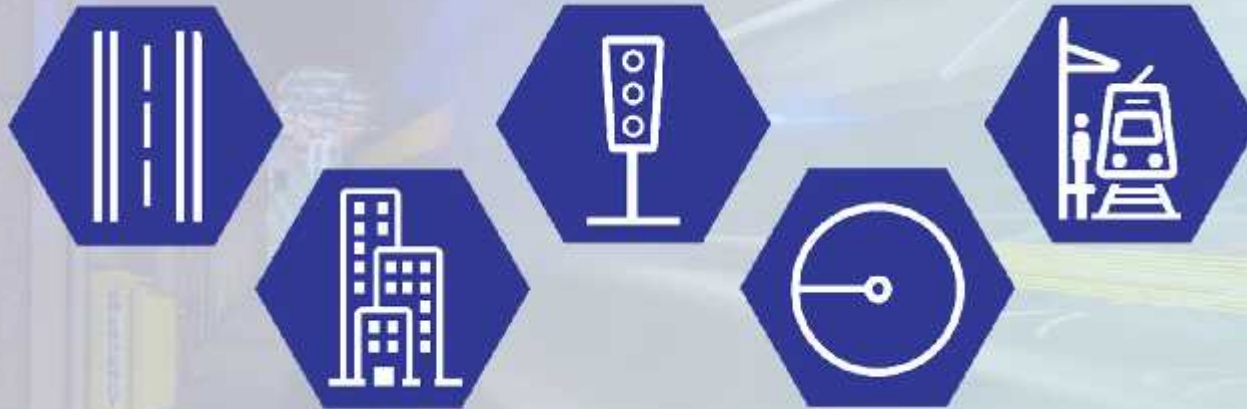
VLAN Info:	Device	VLAN Number	2nd Octet	3rd Octet
	CCTV_CAM	21-214		2 Node
	Presence_CAM	41-414		4 Node
	VMS	61-614		6 Node
	Transit	81-814		8 Node
	Controller	121-1214		12 Node
	Radar_Presence	141-1414		14 Node
	Radar_Advanced	161-1614		16 Node
	Management	201-2014		20 Node
	Future Use	101-1014		10 Node

Note: VLAN Number is 2nd Octet and 3rd Octet (i.e. 1 for cameras and node 5=15)





**Questions?
Want more info?
academy.etherwan.com**



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