

Changing Roles Of Regional Networks

Joint Techs
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Paul Schopis
OARnet

Topics

- History
- Background information
- State's stake in network
- Directives from Governor
- Expanding Roles
- Challenges
- Technology Choices

Thesis

- Looking at historical prospective one observes roles are constantly changing
- Some of those roles help drive technology choices
- Networks which receive state funding are increasingly being asked to view assets as common property

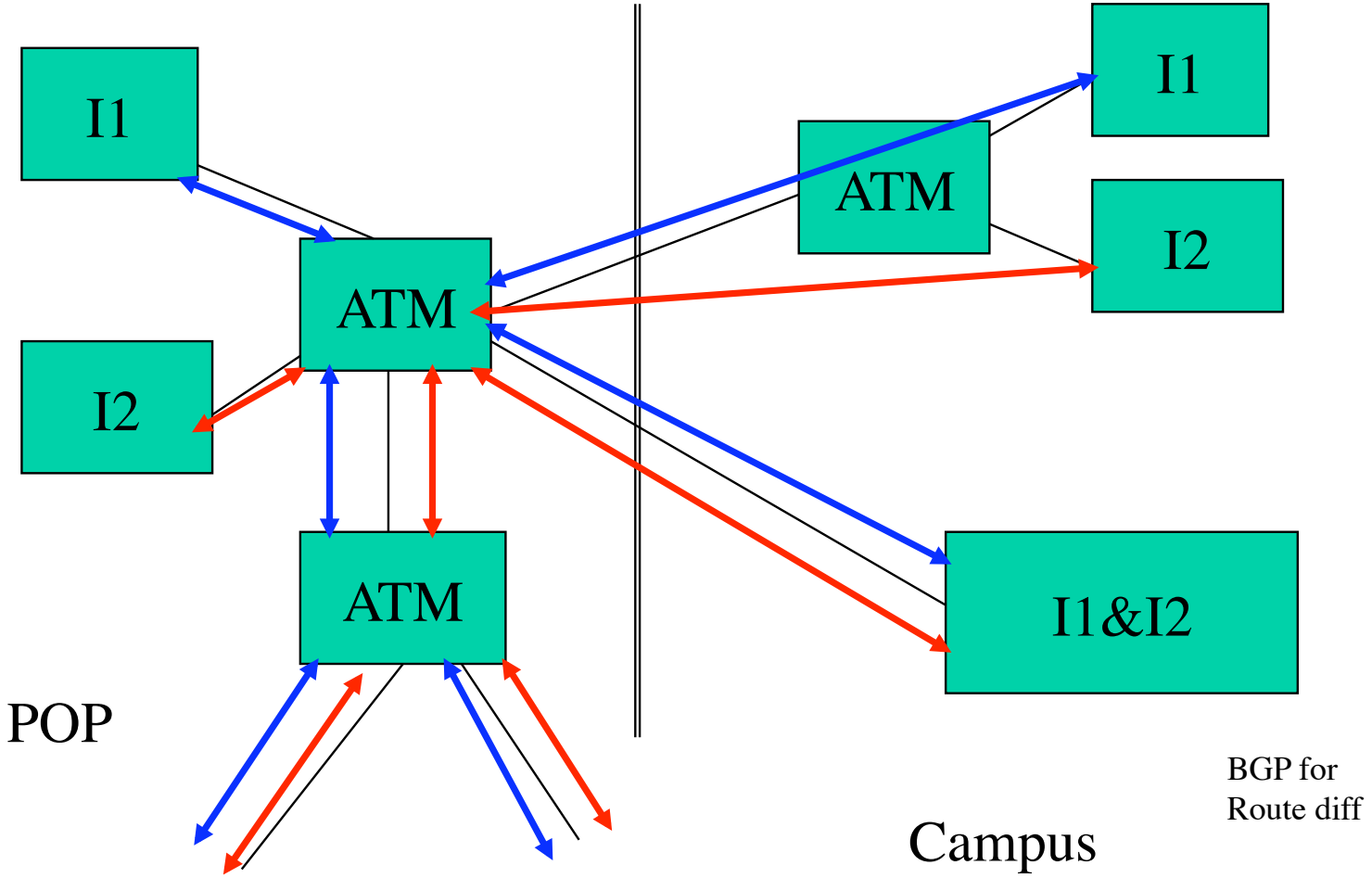
In the beginning...

- Founded in 1987
- Original mission was to provide access to Ohio Supercomputer Center in Columbus, located at Ohio State University
- Original network was star and hub, fifteen 56K lines
- Next generation was provisioned rings eventually going to OC-12
- Tied together all major metro centers

History

- Grew to include most Universities and Community Colleges
- Has 88 member schools - Largest is OSU, smallest is Hebron College.
- Pretty standard IP implementation used ATM as transport etc

Pre Dark Fiber POP Design



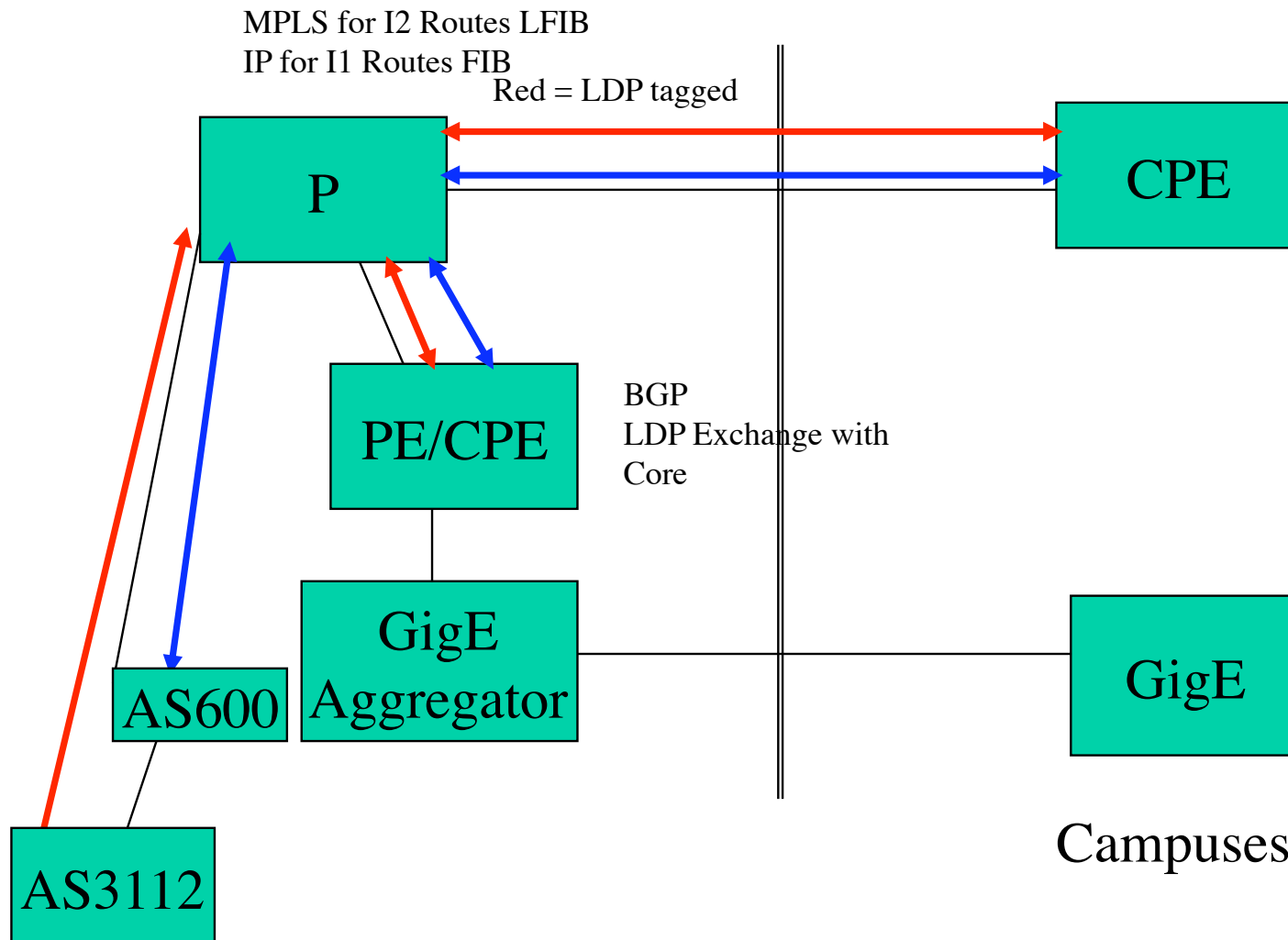
Background

- Starting in 2000 there was investigation into acquiring dark fiber
- Initial efforts got as far as understanding cost, fiber availability etc, then floundered due lack of funds
- Project revived in 2002; Board of Regents provided seed grant of 8.5 million dollars
- OARnet secured loan from Ohio State University for additional funding
- The Ohio K-12 network decided to join as an equity partner contributing 1.2 million dollars

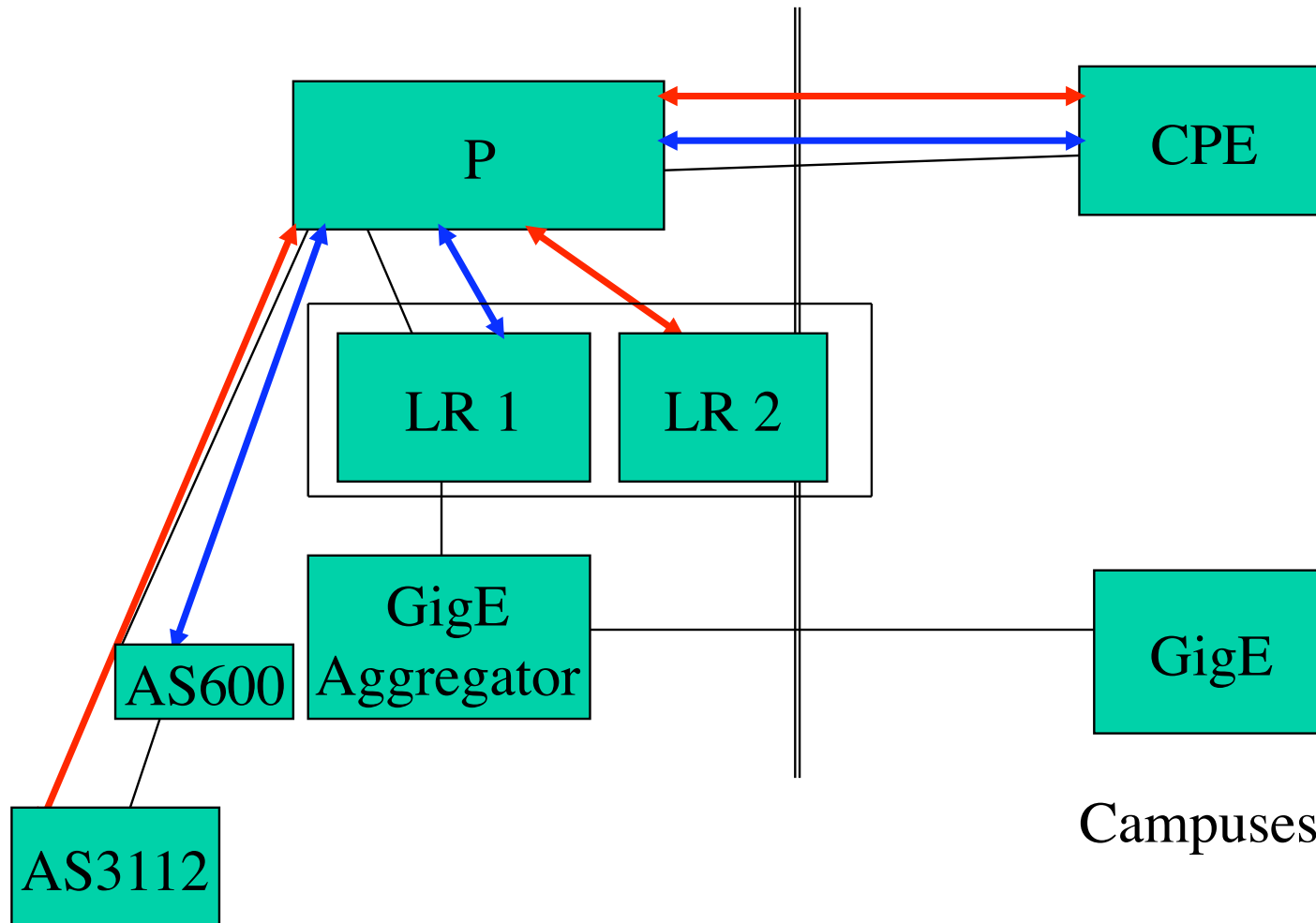
Background

- Floated RFP for state wide fiber
- Multiple respondents
- Large Telcos weren't interested
- Found integrator to pull together multiple respondents; Spectrum networks
- Built first iteration of dark fiber two lambdas on 32 wave system
- Initially OC-48
- From start to finish buying fiber etc ~2 years

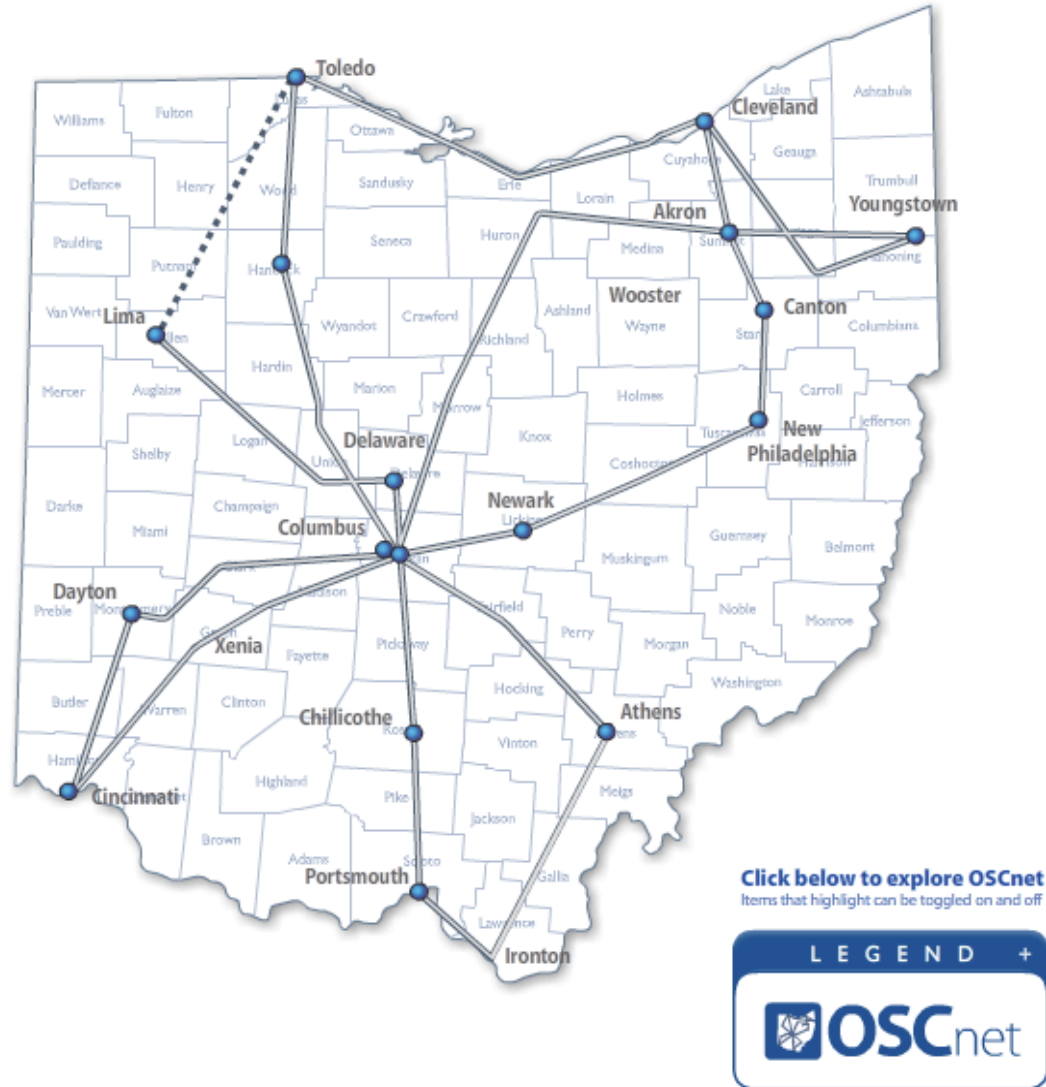
Current Architecture



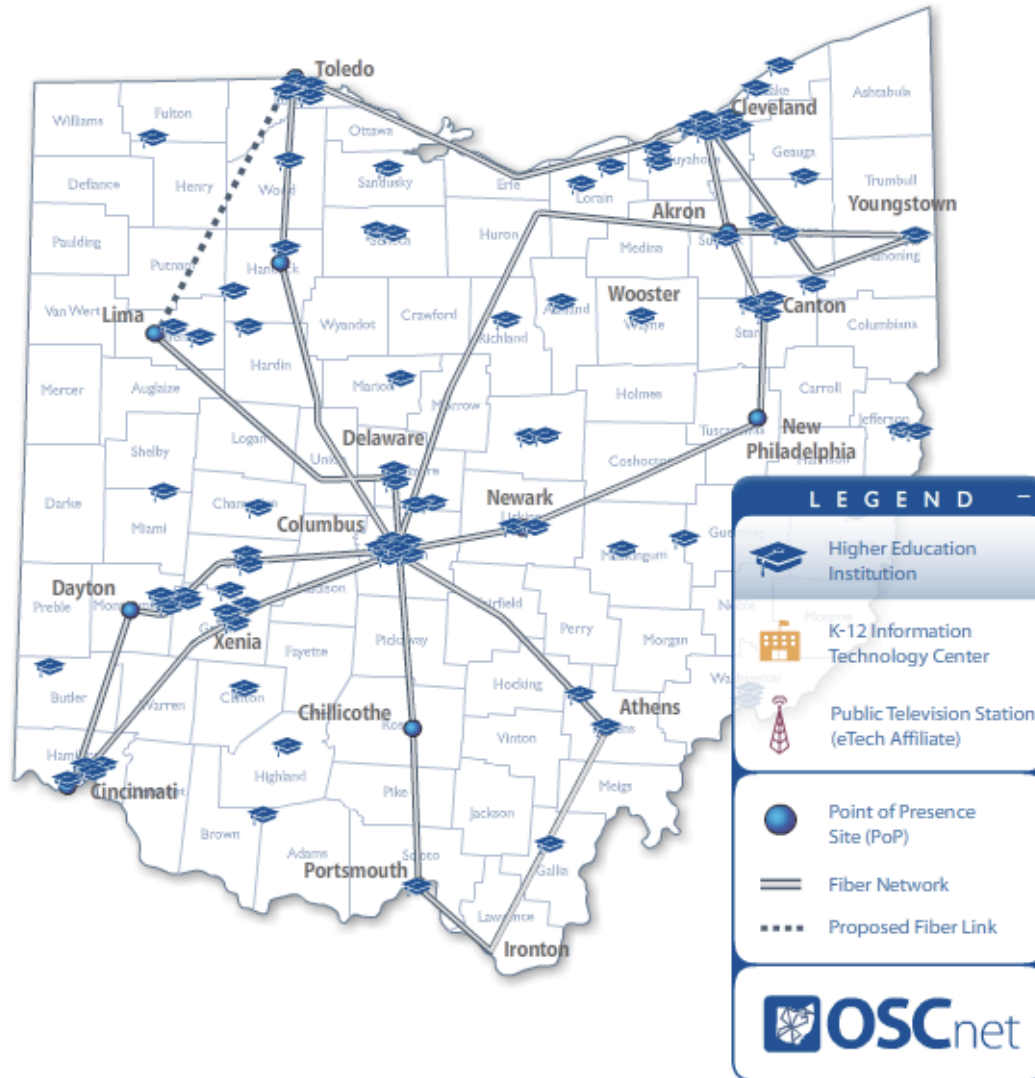
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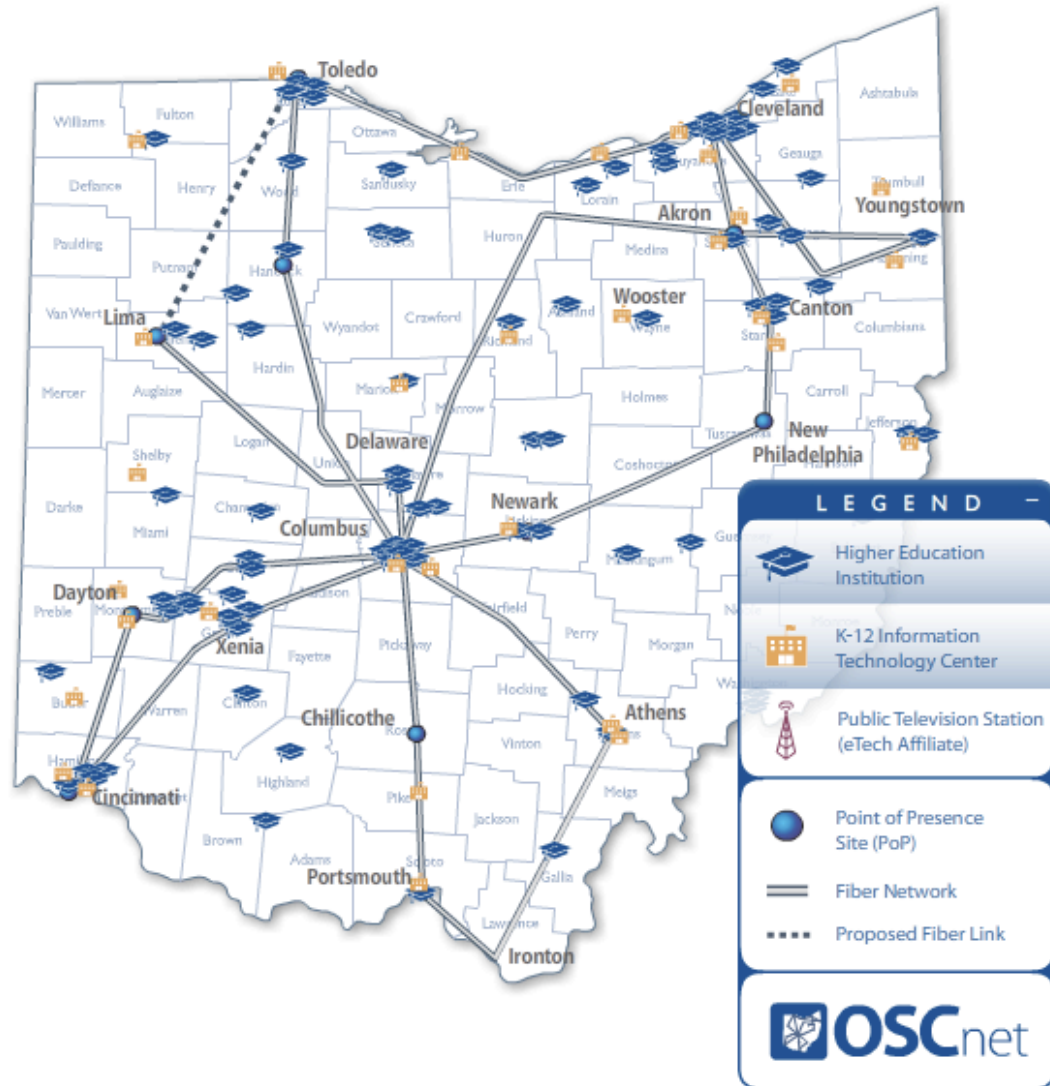
Backbone



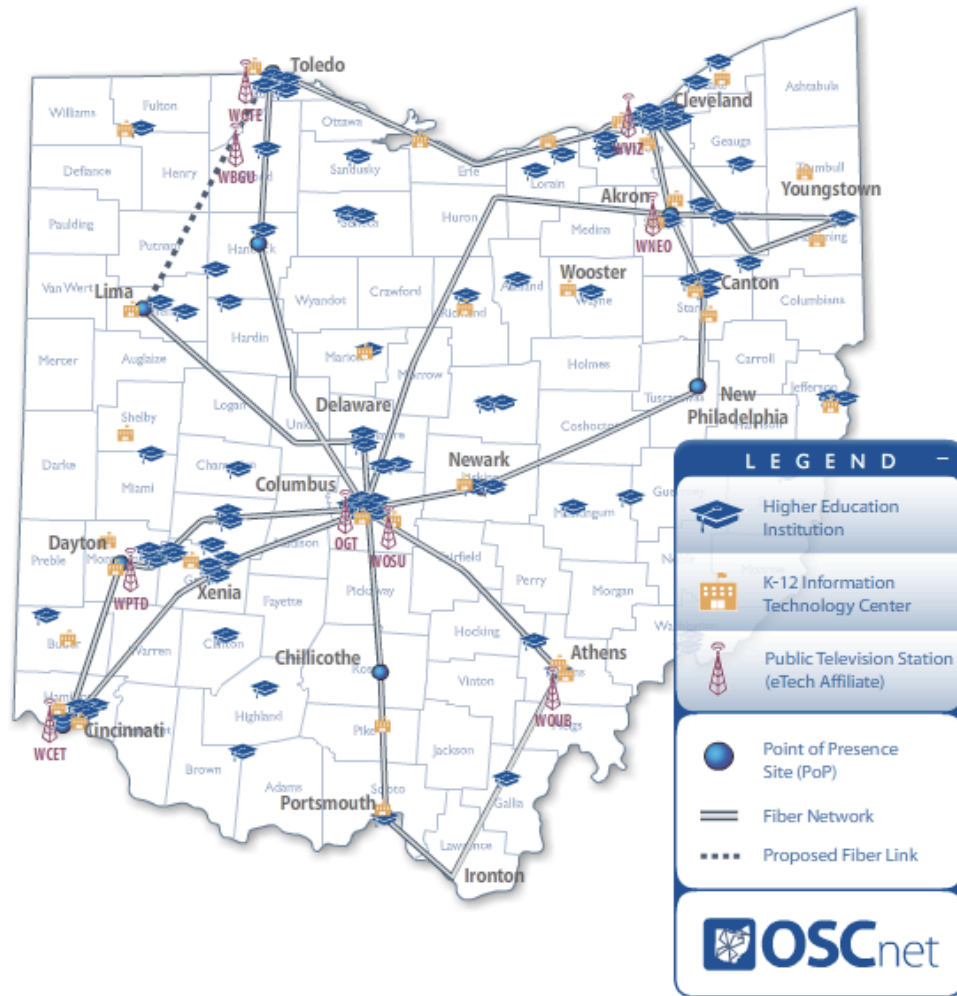
Higher Ed



K-12



Public Broadcasting



Current

- Depending on when snapshot is taken the State had invested ~20 million dollars
- During his campaign Governor Strickland articulated a Broadband Ohio plan.
- In 2007 OARnet and OIT started Phase 0
- In November Governor creates BBO Council and by executive order requires all state agencies under the executive branch to use BBO network (OARnet/OIT)

Phase 0

- Exploits current architecture to provide static “hybrid” network
- Ethernet last mile is run over MPLS core
- Most last mile for state is AT&T Otpiman or Gigaman
- State and OARnet purchased common “portals” thus reducing price for end points
- Tradeoff low price versus performance; acceptable for low bandwidth applications

Phase 0 Issues

- Ethernet visibility
- AT&T uses Cisco3400ME (has some policing issues)
- Juniper bugs
 - Kernel panic causes router crash
 - Failure to restore LSPs correctly

Phase 1

- Phase 0 won't scale 90 colleges + ~30 State Agency sites
- State currently has 3,000 circuits, number will come down as backbone is used
- Anticipating 1,500-2000 circuits in next 3 years
- Overhauling network to meet needs

Phase 1 challenges

- Integration of networks at IP layer
 - First cut will pretty much duplicate Phase 0 with increased peering and shared commodity Internet
- Working out details for better Ethernet management
- Meeting operational challenges in NOC
 - Desire to combine NOCs
 - Desire to combine tools
 - Mandate for additional services in NOC

Phase 1

- Installing 10G statewide (about 40%) today
- Upgrading to ROADMS
- Installing
 - 5 M320s
 - 16 7609s
 - Upgrading 30 M7i, M40e, and M10i

Additional Challenges

- Chancellor separated OSC and OARnet into independently governed organizations
- Board of Regents has created the Ohio Digital Commons for Education
- Will create leveraging of resources into common platforms. Example OARnet does all networking etc