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OneLab: Federation and Testbeds

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Future Internet Characteristics

- World scale
- Edge apps wait for no man
 - The AppStores are their testbeds
 - But many fail because core services, fast reliable networks, coverage of LBS aren't adequate or appropriate
- All need to adapt/respond to growing expectations.

Federation

- Basic technique for world scale management of Internet testbeds
- Over geography:
 - PlanetLab(s) – PLC, PLE, PLK,...
- Over heterogeneous technologies
 - NITOS wireless building testbed, others...
 - DTN and autonomous networks with non-IP protocols
- Testing that joins the edge to the clouds is key

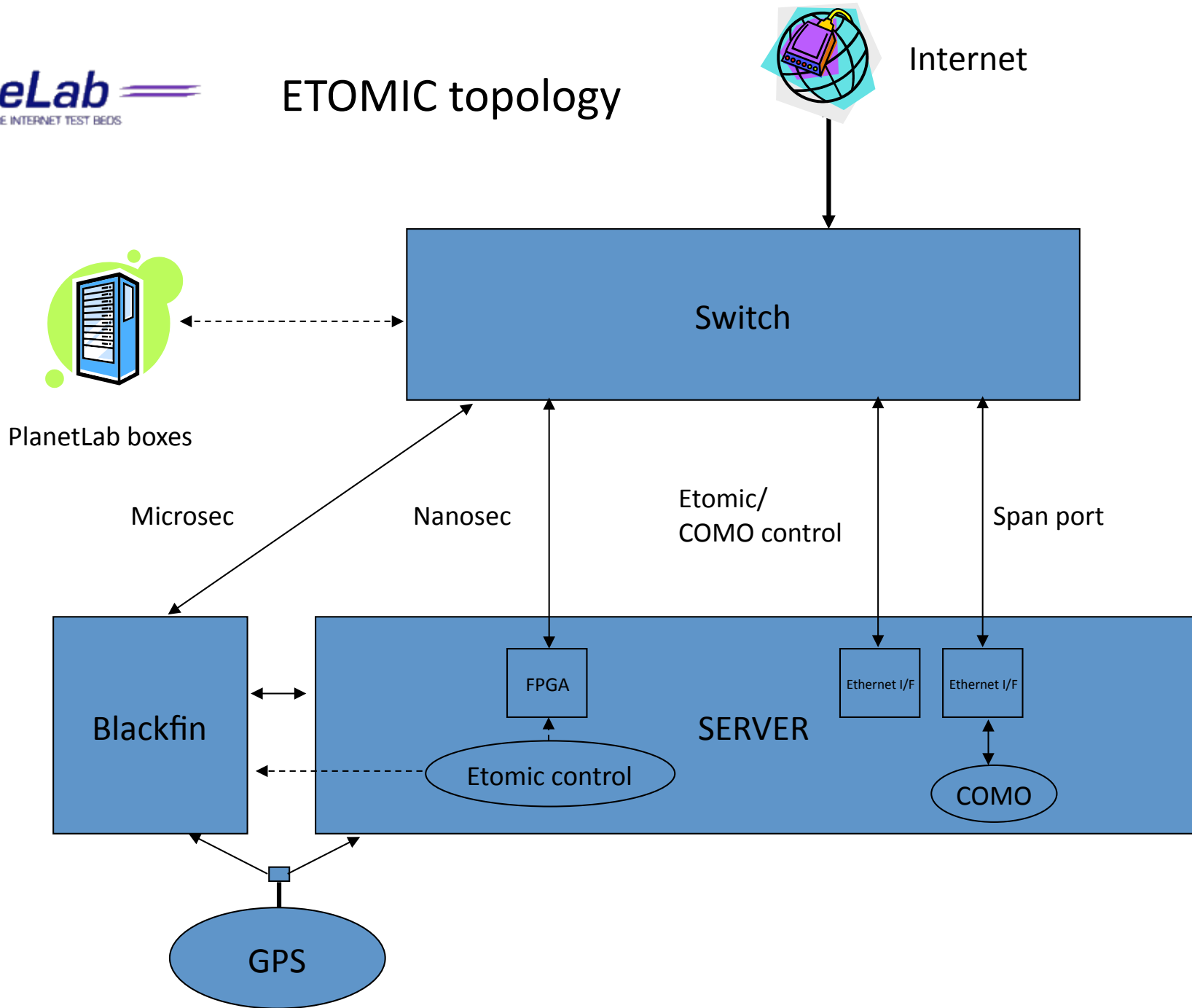
Where do we go next?

- Extend federation support as middleware
 - Across control plane (access, security, privacy)
 - Across “experimental plane”
 - Resource discovery, acquisition and dispatch
 - Data definitions for interchange
 - Visualization, archiving, sharing or distribution
 - Monitoring usage, trends to assure sustainability

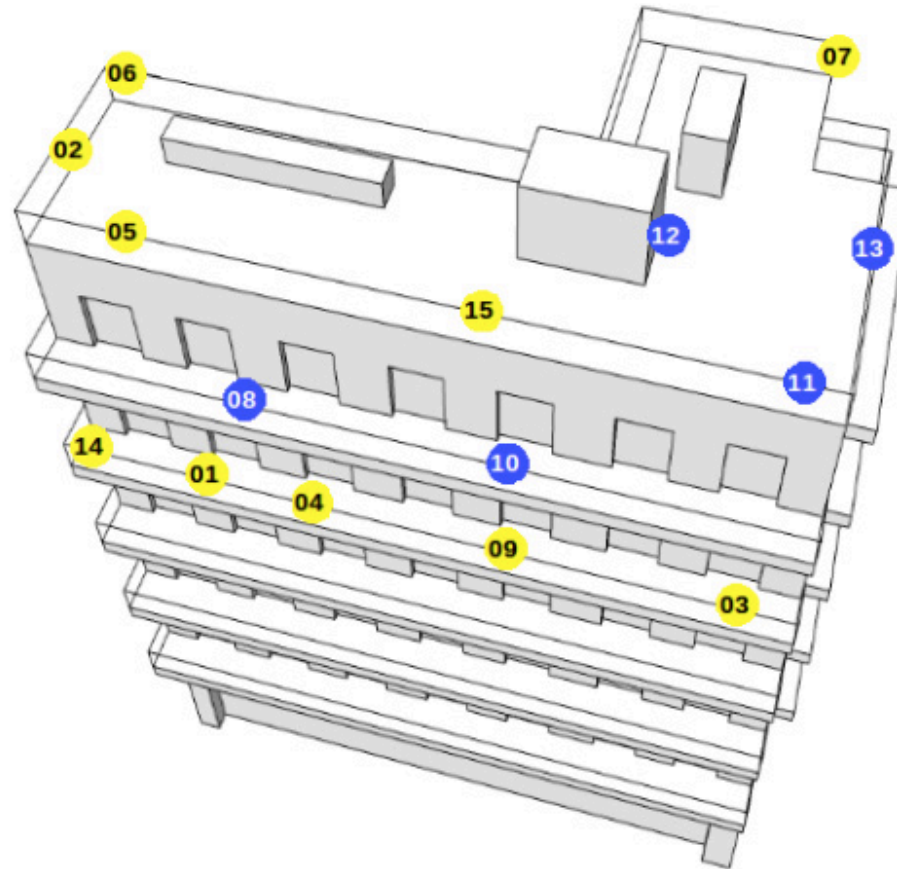
Where do we stand today?

- Oldest resources – active measurement tools (2004+)
 - DIMES (www.netdimes.org) volunteers, software client
 - Internet topology over time, at AS, city, POP,, IP level
 - Several thousand active agents, data public, used by ~30 academic groups
 - ETOMIC () dedicated hardware, some with hardware assist
 - Capacity measurements across Europe
 - Packet train probes
 - >100 registered users
 - SAC -- non-ip, autonomous and DTN networks
 - NITOS – wireless in-building testbed, OMF controls

ETOMIC topology



NITOS configurations



- Blue dots represent Diskless Nodes
- Yellow dots represent Orbit Nodes