

Future Infrastructure Planning

LSN Meeting - 2/14/17

John Moore

Internet2

Topics

Framing

Planning process - approach to date

Highlights based on initial input

Next Steps

Questions

Framing

Community investment

National-scale infrastructure

Support for research and education in the US

Input gathering process

Call for Papers and Workshop

- Great community input - more than 35 white papers
- Mostly folks we talk to often - regionals, campus IT/networking folks
- Industry members engaged - opportunity to improve collaborations

Working groups formed

- First - focus on academic enterprise needs
- Second - focus on research community needs
- We need to strive to include more voices - broader input

Highlights - input to date

Infrastructure and services ecosystem

Partnerships

Infrastructure as a platform

Engineering and Architecture - assumptions and ideas

Advocacy and coordination

Infrastructure and services ecosystem

- Internet2 should be a convener for efforts that aim to provide infrastructure and services that require greater collaboration among community stakeholders - “It’s an ecosystem, not a hierarchy”
 - Services need to be crafted with the entire ecosystem in mind - think beyond organizational boundaries
 - Scope needs to be national and international, services need to be integrated and federated
- Two complementary trends are becoming apparent
 - Provisioning of the technical platform will rely more on software, less on manual configuration
 - The overall service delivery model will require more human interaction and collaboration to provide bespoke solutions to properly support science workflows - facilitator model

Partnerships

- Integrated services require tighter coupling of all providers in ecosystem
 - Regionals, campuses, NRENs, international campuses, scientific instruments, etc.
 - Assumption: Requires strong operational coordination - lots of effort
- Engage with industry members
 - Need more R&D partnerships, less sales opportunities
 - Need value going both ways for effective, stable partnership
- Engage with open industry collaborations
 - Open Compute Platform, CORD, etc.
 - Focus on web-scale efforts, as opposed to traditional carriers

Infrastructure as a platform

- The community needs a platform for experimentation,
 - It should adapt to the user's current needs, not be static
 - Predictable (stable?) API needed
- The “refresh” approach needs to be incremental
 - Experiment and validate new technologies, processes, collaborations
- The platform should:
 - Be nimble - easy to add new services
 - Enable research that can't be done (easily? cost-effectively?) otherwise
 - Support services at different scales
 - Integrate commercial cloud services in a fundamental way
 - Provide dedicated, tuned connectivity between Science DMZs

Engineering & Architecture - assumptions

- Services for the academic enterprise and research support should be “separated”
 - What degree of separation is needed?
 - Is “research” one size fits all?
- Cost-effectiveness should be a key design requirement
 - Avoid stranded capability
- Transparency should be a fundamental design principle
 - Monitoring, measurement, analysis - scalable streaming analytics
 - Serves operational needs, mission (source of research data, advancing infrastructure state of the art) and allows fundamental shift to providing application QoE

Engineering & Architecture - ideas

- Target a cheap, reliable core with smart, flexible local edge
 - Core - simple, fast and resilient. And cheap.
 - Edge - programmable for service chaining, managed centrally, deployed at regionals and campuses
- Rethink peering service
 - Target cost-effective delivery of "high-value" peers
- Shareable, distributed, generalized compute infrastructure
 - Move data, or provide compute where data is
- Trusted infrastructure
 - Security, resiliency, trust & identity all integrated

Advocacy and coordination

Internet2 should:

- Advocate for national and state investment in R&E
- Convene stakeholders for planning and operational coordination
 - NRENs, campuses, international commercial service providers, etc.
 - Coordinate with national CI projects - XSEDE, OSG, ACI REF, CIARA, etc.
 - Best common practices, open source development and deployment, promoting resource sharing, etc.
 - Leverage investment that NSF has made in campus cyberinfrastructure
- Engage the community around workforce development needs
 - How do we staff (short term) and develop talent (longer term) for upcoming needs
 - Education for facilitators, DevOps talent, etc.

Next steps

- Working groups will work to refine and document requirements
 - Support for the Academic Enterprise
 - Support for Research
 - Complete draft plan in April at Internet2 Global Summit meeting
- Circulate draft plan for further comment
 - Interested in engaging community members who don't normally think about infrastructure requirements
- Provide input to next level of refinement where needed - high-level design, organizational coordination, etc.
- Begin to define and execute infrastructure experiments and pilots as appropriate

Questions?

John Moore

AVP, Network Architecture & Planning

Internet2

jmoore@internet2.edu