Future Infrastructure Planning

LSN Meeting - 2/14/17

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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?

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