

2016 Inter ba63d

2016 Internet2 Global Summit

2016 Internet2 Global Summit

- Monday
- General Session

o Dave Lambert

- 20th anniversary of Internet2lk
- Listed off the participants of that first founding meeting 20 years ago. Anne M on the list!

o Recognition of prior chair

o Introduction of new chair

o Jim Bruce, former CIO of MIT/founding Internet2 member.

o Retrospective on various critical moments in the establishment of both Internet and Internet2

- Information-centric Networking

o Use cases

- Genomic data
- Multicast ' any cast

o Who is active in ICN?

- Cisco, PARC, NICT, INRI, CAIDA, UCLA, Colorado State, Washington U, Case Western

o Goal building an ICN test bed on Internet2

- Compare w/ CDN and other IP-based technologies
- Focus on new applications, routing/forwarding, caching, name space Mgmt

o Ignacio Solis from PARC

- Definitions

♣ ICN Information Centric Networks

- ♣ CCN content centric networks
- ♣ NDN named data networks
 - CCN Messages (packets)
- ♣ Interest message
- ♣ Content object (mostly payload)
 - CCN benefits
- ♣ Security object-based, not host-based (data I secure in motion and at rest)
- ♣ Native multicast
- ♣ Network collaboration network can participate in flow control
- ♣ Caching data can be cached at any location for spatial and temporal reuse
- ♣ Throughput can be tuned due to explicit feedback from network
- ♣ Resilience architecture is resilient and transmissions can be locally repaired
 - Can re-route packets on the fly
 - CCN for large data sets
- ♣ Deduplication
- ♣ Native change sets
- ♣ Multi-point
 - CCN forwarder architecture
- ♣ PIT pending interest table (outstanding interests in this node. Reverse path info)
- ♣ CS content store. Really more like a content buffer.
- ♣ FIB forwarding information base. Populated by routing.
 - Overall Architecture
- ♣ App → information framework → transport framework → forwarder → cache
 - Producer, producer, cache, cache
- ♣ not socket-based, not entirely TCP friendly
- o Ralph Droms from Cisco (met him at Cisco multicast DNS meeting)
 - ICN testbed

- ♣ UCSC, Cisco, PARC, Internet2, Clemson
 - goal of testbed is to bypass TCP congestion control w/ a pure network underneath
 - Testbed node
- ♣ Application / ICN forwarder sent via UDP
- ♣ ICN Forwarder on UCS
- ♣ Campus I2 demarc to AL2S
 - Participation in the ICN backbone as an institution
- ♣ Available as part of Internet2 membership
- ♣ Backbone project will install and operate an ICN forwarder in your Datacenter
- ♣ They'll install and operate a forwarder
- ♣ We would provide connection from ICN forwarder to your Internet2 demarc
- ♣ Connection from ICN forwarder to platforms running ICN apps
 - Research Avenues
- ♣ How to write applications or do video delivery using this sort of caching/info based networking
- ♣ Internet of Things is a specific application to this using ICN to address content of interest to constrained networks (lower power, often asleep, low-end stack for sensors, etc.)
 - Current state
- ♣ Questions about scale
- ♣ Takes more processing (tracking interest, looking for subscribers in the PIT, caching, FiB queries)
 - Real-Campus SDN Implementations
- o Panel Discussion w/ participants from:
 - Univ of Kentucky
- ♣ Had some advanced network research looking to do some SDN stuff
- ♣ Open flow-based work w/out a lot of new gear investment
- ♣ Key deliverable of reducing congestion

- ♣ Key focus was on research enablement and leaving administrative applications on pretty default settings
- ♣ Goal to push more intelligence higher up in hierarchy and let the access layer be pretty dumb
- ♣ Has gone very multi-vendor but using open flow as common denominator
- ♣ Especially for high-speed off-ramps for research purposes
- ♣ SDN to the rack
- ♣ Suggestions
 - Don't listen to vendors, hostile to SDN
 - Open-ended possibilities moving from hardware to software and re-programmability
 - Washington State U
- ♣ Really big lifecycle replacement, wound up w/ a production SDN implementation almost by accident
- ♣ Used Plexxi w/ ring-based switches and an SDN controller on the side
- ♣ Trying to use physical layer ' bandwidth / fiber more efficiently
- ♣ Using passive optical gear everywhere, not doing switches any more
- ♣ Even fiber to desktop which can be moved to research network
- ♣ Can be demoted from 10gb research network back to regular 1gb network if bandwidth not used
 - NSF
 - GWU
 - Argonne National Lab
- ♣ Goal adaptive QoS for Science Data flows
- ♣ Data from genomics and dark energy/astronomy surveys forecasted to generate an exabyte every 30 days in the next couple of years. An exabyte a day by 2020?
- ♣ Desired SDN applications
 - Bandwidth reservation for researchers Network Reservation Service
 - Playing around w/ also reserving paths as well
- o A few conclusions

- Look around real-world SDN implementations are happening, value being provided
- Get a really good network architect that is open-minded (don't be tied to the guy who only knows what he's built for the last 20 years)
- WSU's SDN/Plexxi based solution wound up saving 50-60% on capital
- While openflow is a neat way to do smart traffic engineering, big gains to be made by focusing on orchestration especially for WAN

Tuesday

- General Session

o From Brocade

- Fabrics in the Datacenter are our future
- Network virtualization is real, should be pursued, should be cloud-ready to support hybrid environments
- Invest in your staff training, need to move beyond network engineers as CLI jockeys

Wednesday

- Internet Freedom and Ethics of Technology

o Balance the desire to open and share science data with need to anonymize the data

o Nelson Mandela Day dedicated 68 minutes of your day to the public good (he dedicated 68 years of his life to the public good)

o Speaker tried to teach a class of 14 year olds in a poor part of South Africa about what the Internet is

- None of them had computers, 2 had mobiles w/out smart phone abilities
- Hard to talk about the Internet w/ them

o Speaker was chairing a meeting on Gopher at IETF and in comes Tim Berners-Lee to talk about HTTP. Unimpressed at first. Initial discussions on URL including arguments about whether http: should be mandatory or not

o Challenge increasing expectation that we communicate digitally with companies, governments, each other at same time our trust in digital communications is going down

o Areas of threat

- Privacy

♣ Religious privacy

- ♣ Body privacy leaking wearable info
 - ♣ Conflict between desire for privacy and "you shouldn't have anything to hide"
 - Permissionless innovation
 - ♣ Internet/R&E as digital playground
 - Cyber threats cybercrime, hacktivism, identity theft, cyber terrorism, malware, APT
 - Government infringement on Internet freedoms
 - ♣ Governments are creating back doors, not reporting vulnerabilities so that they can use them
 - ♣ Mass surveillance
 - ♣ Trying to weaken systems, encryption, and technologies
 - o Anecdote about when everyone first realized that domains were marketing/brand labels and not just convenient shortcuts to IP addresses.
 - Jon Postel had announced that Proctor and Gamble was registering domains like / babysoap.com/ etc etc.
 - o R&E/NREN's should get more involved in these discussions
 - o Don't give up your privacy for free services or safety
 - o challenge our governments and our service providers to ensure it stays open, trustworthy, and accessible
- Monday Conference Schedule:
- 1:15pm - 2:30pm
 - o General Session, Chicago Ballroom 5th Floor
 - 3pm - 4pm
 - o Information-centric networking at Internet2
 - o Great America 1&2 6th floor
 - o or
 - o Commoditizing Cloud Adoption
 - o Michigan 6th Floor
 - 4:30pm - 5:30pm

o Real Campus SDN Implementations

o Great America 1&2 6th Floor

Tuesday Conference Schedule:

- 7:30am

o Securing the Science DMZ

o Minnesota 6th Floor

- 8am

o SDN Optimized Advanced Network Services for Experiments

o Denver 5th Floor

- 8:45am

o Advanced Network Services Today

- Indiana/Iowa 6th Floor
- 10:30am

o General Session

o Chicago Ballroom 5th Floor

- 11:45am - 1:15pm

o Level 3 R&E Customer Advisors Panel

o Joe's Seafood & Prime Steak

o Turn left toward N Rush St

o Turn Right onto E Grand Ave

o destination will be on corner of N Rush St and E Grand Ave

- 1:15pm

o Further Defining a Global Network Architecture

o Chicago Ballroom 5th Floor

- 3pm

o perfsonar — last mile visibility at RNP

o Chicago Ballroom 5th Floor

- 4:30

o Moving Infrastructure to the Cloud (Me)

o Chicago Ballroom 5th Floor

Wednesday Conference Schedule:

- 8:45am

o Supporting Transnational Education — the NREN's role

o Michigan/Michigan State 6th Floor

- LEAVE FOR AIRPORT

#learning/conferences