SDI/SDX Workshop Agenda

Thursday, February 4

8:00	–	8:30	Breakfast	*Provided*
8:30	–	8:45	Welcome: Workshop goals and logistics	Workshop chairs
8:45	–	9:15	Keynote I	Nick Feamster
9:15	–	9:30	Breakout instructions	Workshop chairs
9:30	–	12:00	Breakout Session I	*Four in parallel*
12:00	–	1:00	Lunch	*Provided*
1:00	–	1:30	Keynote II	Marco Canini
1:30	–	4:00	Breakout Session II	*Four in parallel*
4:00	–	5:00	Outbriefs from Breakouts I and II	Breakout chairs

Friday, February 5

8:00	–	8:30	Breakfast	*Provided*
8:30	–	9:00	Keynote III	Orran Krieger
9:00	–	11:30	Breakout Session III	*Four in parallel*
11:30	–	12:00	Outbriefs from Breakout III	Breakout chairs
12:00	–	1:00	Conclusions from the workshop	Workshop chairs
1:00			Boxed lunches	*Provided*

Breakout rooms

Washington Floor 4, suite 400. *The same meeting room used for plenary sessions*

Dupont Floor 7, suite 750. *To the right of the elevators. Upon entering the suite, the first conference room to your right.*

Mt. Vernon Floor 9, suite 900. *Inside the Internet2 suite.*

Farragut Floor 9, suite 900. *Inside the Internet2 suite.*

Breakout format

Breakout topics, chairs, and attendees will be determined in advance of the workshop. Participants will vote online on interesting topics for breakouts, and the workshop chairs will pick breakout chairs and assign attendees to breakouts.

Each breakout starts with 4-5 "lightning" talks of 5 minutes each, no slides. Each attendee who submitted a whitepaper will give a talk in one of the breakouts. The remaining 2 hours are for discussion and synthesis.

The primary outputs of each breakout are to be:

1. A set of N (suggested: $N = 3$) areas of research likely to be interesting 5–10 years out:

- A 'bullet point' statement of the area
- The identity of someone assigned to write a short piece about it

2. A set of M requirements for infrastructure, data, other 'non-research' prerequisites for doing the work

Note: The "topic" assigned for the each breakout is a starting point, not a hard and fast rule. It is perfectly acceptable for the areas of research to stray from that starting point. However, the workshop is focusing on research in the years 2020 and beyond, and that focus should be maintained.

OUTBREIF FORMAT

Each breakout chair gets 5 minutes to present the outputs of the breakout. The remainder of the time (~10 minutes) is used for the audience to suggest common themes that are seen in more than one of the breakout outputs, and to identify the most pressing issues.

FINAL CONCLUSION SESSION

The goal of this session is twofold:

1. Pick a set of research areas and infrastructure requirements to highlight in the final report. (All will be included, but we want to highlight a 'top N' set.)

2. Pick a set of themes (identified in the outbriefs) that seem the strongest and/or most common to highlight in the final report.

Breakout Session I (Thursday Morning)

Models for programming and verifying SDI

Room: **Mt. Vernon** Chair: **Aditya Akella**

- **Anduo Wang:** *Software-Defined Networks as Databases*
- **KC Wang:** *How to Derive Abstraction for Software Defined Infrastructure and Software Defined Exchange*
- **Rick McGeer:** *Declarative Verifiable SDN Specification*
- **Theo Benson:** *Commoditizing the "S" in SDN with BareMetal Switching Infrastructure*
- Aditya Akella
- Dan Kilper
- James Chacko
- Joe Touch
- Mehrdad Moradi
- Srinivasan Seshan

SDXes in practice (experience with SDX and SCI-DMZ deployments)

Room: **Dupont** Chair: **Yang Guo**

- **David Reese:** *Pacific Wave SDX*
- **Hyojoon Kim:** *ScienceDMZ and IPS Bypass*
- **Jerry Sobieski:** *Thoughts on Research Topics and Tools for Future Research*
- **Joe Mambretti:** *Next Generation Infrastructure Based on SDI, SDN, and SDX Architecture and Technologies*
- **Russ Clark:** *Software Defined Infrastructure in the AtlanticWave SDX*
- **Tom Lehman:** *Software Defined Exchange (SDX) and Software Defined ScienceDMZ (SD-SDMZ) Ecosystem*
- Arpit Gupta
- Balachander Krishnamurthy
- Bruce Patterson
- David Stern
- Haoyu Song
- Yang Guo

Co-evolving applications and infrastructure

Room: **Farragut** Chair: **Mike Zink**

- **Bryan Larish:** *White Paper Response to Call for Participation: SDI/SDX Workshop*
- **Glenn Ricart:** *Whitepaper from Glenn Ricart*
- **Nagi Rao:** *Co-Designed SDIs for Computing and Physical Complexes Using Integrated Analytics*
- **Rudra Dutta (NCSU):** *Human-Network Interaction: the Weakest Link?*

- **Zhi-Li Zhang:** *Integrating Application-Aware Virtualized Network Functions in Software-Defined Infrastructure*
- Andy Bavier
- Ben Mack-Crane
- David Du
- Ibrahim Matta
- Madeleine Glick
- Mario Gerla
- Mike Zink
- Orran Krieger
- Raj Kettimuthu
- Rodrigo Fonseca
- Yan Luo

Connecting across domains (policies, resource brokering, etc.)

Room: **Washington** Chair: **Tilman Wolf**

- **Ilya Baldin:** *SDI Research Challenges and Opportunities*
- **John Moore:** *SDN Infrastructure Ecosystem*
- **Ken Calvert:** *Enhancing Network Services Through SDXs*
- **Malathi Veeraraghavan:** *Multi-domain, multi-layer software-defined infrastructure*
- **Mark Berman:** *Transforming Scientific Collaboration via Software-Defined Infrastructure*
- **S. J. Ben Yoo:** *A Market-Driven Broker Plane for Multi-Domain Software-Defined Infrastructures*
- Alvaro Cardenas
- Byrav Ramamurthy
- Cees de Laat
- Ethan Katz-Bassett
- Hongxin Hu
- Inder Monga
- James Griffioen
- John Wroclawski
- Marco Canini
- Munindar Singh
- Raj Jain
- Tilman Wolf
- Tim Talty
- Xenofontas Dimitropoulos

Breakout Session II (Thursday Afternoon)

The future of programmable network hardware

Room: **Mt. Vernon** Chair: **Marco Canini**

- **Ben Mack-Crane:** *Understanding and Managing Change in an SDN*
- **Dan Kilper:** *Deep programmability for optical systems in the future Internet*
- **Haoyu Song:** *Open Programmable Data Path: Towards White Box 2.0*
- Balachander Krishnamurthy
- Bryan Larish
- David Stern
- Hyojoon Kim
- Jerry Sobieski
- Marco Canini
- Yang Guo

SDI as a marketplace

Room: **Dupont** Chair: **Rodrigo Fonseca**

- **Bruce Patterson:** *White Paper Response to Call for Participation: SDI/SDX Workshop*
- **Cees de Laat:** *The Service Provider Group Framework*
- **James Griffioen:** *SDXs as Resource Marketplaces*
- **Munindar Singh:** *Software-Defined Governance: Applying Computational Norms*
- **Tilman Wolf:** *Application for Participation in Software Defined Infrastructure / Software Defined Exchange Workshop*
- Glenn Ricart
- John Moore
- John Wroclawski
- Ken Calvert
- Orran Krieger
- Rodrigo Fonseca
- S. J. Ben Yoo

Intereconnecting different technologies: mobile, optical, and storage

Room: **Farragut** Chair: **Mark Berman**

- **David Du:** *Beyond the Internet: Convergence of Networking and Storage Becomes A Must*
- **James Chacko:** *Software-Defined Communication Testbed*
- **Madeleine Glick:** *Shaping and quality of service in SDN controlled hybrid optical/ electrical networks enabled by machine learning*
- **Mario Gerla:** *A wireless SDN inter exchange for mobile systems*
- **Tim Talty:** *The Role of Mobile Assets in Future Software Defined Infrastructure*
- Alvaro Cardenas

- Anduo Wang
- Hongxin Hu
- Joe Touch
- KC Wang
- Mark Berman
- Mehrdad Moradi
- Rudra Dutta (NCSU)
- Russ Clark

End-to-end: SDI across the wide area

Room: **Washington** Chair: **Ethan Katz-Bassett**

- **Aditya Akella:** *Toward end-to-end software defined QoE*
- **Byrav Ramamurthy:** *Balancing Exchange Points Communication and Inter-controller Communication for Inter-Domain Routing*
- **Inder Monga:** *End-to-end, multi-domain SDN with SDI bookends*
- **Srinivasan Seshan:** *Cooperation Between Control Planes*
- **Xenofontas Dimitropoulos:** *Stitching Inter-Domain Paths over IXPs*
- Andy Bavier
- Arpit Gupta
- David Reese
- Ethan Katz-Bassett
- Ibrahim Matta
- Ilya Baldin
- Joe Mambretti
- Malathi Veeraraghavan
- Mike Zink
- Nagi Rao
- Raj Jain
- Raj Kettimuthu
- Rick McGeer
- Theo Benson
- Tom Lehman
- Yan Luo
- Zhi-Li Zhang

Breakout Session III (Friday Morning)

Measuring and Monitoring

Room: **Mt. Vernon** Chair: **Rudra Dutta**

- **Balachander Krishnamurthy:** *What we can learn from OpenFlaw*
- **Mike Zink:** *White Paper for Software Defined Infrastructure / Software Defined Exchange Workshop*
- **Yan Luo:** *Challenges and Opportunities of Measurement for Future Software Defined Infrastructure*
- Ben Mack-Crane
- Cees de Laat
- Dan Kilper
- David Stern
- Nagi Rao
- Rudra Dutta (NCSU)
- Xenofontas Dimitropoulos

SDXes and the Internet model (layering, the end-to-end argument, AS model, etc.)

Room: **Dupont** Chair: **Tom Lehman**

- **Arpit Gupta:** *An Industrial-Scale Software Defined Internet Exchange Point*
- **Ethan Katz-Bassett:** *Real Internet Experiments for Future Internet Services*
- **Ibrahim Matta:** *BU submission*
- **Joe Touch:** *The role of state and layering in software-defined networking*
- **John Wroclawski:** *The Tiger Meets the Termite Mound: Toward Robust Inter-Domain SDN*
- Bruce Patterson
- Bryan Larish
- David Du
- Ken Calvert
- Marco Canini
- Srinivasan Seshan
- Tom Lehman

Securing SDI

Room: **Farragut** Chair: **Jim Griffioen**

- **Alvaro Cardenas:** *Secure Software-Defined Federated Networks*
- **Hongxin Hu:** *Virtualizing and Utilizing Network Security Functions for Securing Software Defined Infrastructure*
- **Mehrdad Moradi:** *Exploring Security and Mobile Operator Use Cases for SDX*

- **Yang Guo:** *SDI Workshop*
- Byrav Ramamurthy
- David Reese
- Glenn Ricart
- Hyojoon Kim
- James Chacko
- James Griffioen
- Joe Mambretti
- John Moore
- Malathi Veeraraghavan
- Mario Gerla
- Munindar Singh
- Russ Clark
- Tilman Wolf
- Tim Talty

Virtualizing SDI in the datacenter and cloud

Room: **Washington** Chair: **Theo Benson**

- **Andy Bavier:** *CORD: Central Office Re-architected as a Datacenter*
- **Raj Jain:** *Software Defined Cloud Virtualization for Multi-Cloud Applications*
- **Raj Kettimuthu:** *Software Defined Infrastructure: Challenges and Opportunities*
- **Rodrigo Fonseca:** *Towards a Network Marketplace in a Cloud*
- Aditya Akella
- Anduo Wang
- Haoyu Song
- Ilya Baldin
- Inder Monga
- Jerry Sobieski
- KC Wang
- Madeleine Glick
- Mark Berman
- Orran Krieger
- Rick McGeer
- S. J. Ben Yoo
- Theo Benson
- Zhi-Li Zhang