The Massachusetts Open Cloud (MOC)

Workshop Oct 30, 2018
Long term project goals

- Create at-scale efficient production cloud
  - suitable for sharing and analyzing massive data sets and supporting broad set of applications.
- Create an Open Cloud eXchange (OCX)
  - enabling level playing field, competition, innovation by broad community, research
- Create a testbed for researchers, open source developers, startups
MOC Ecosystem

Users/applications
BigData, HPC, Life Sciences, …

Education and Workforce
Students, industry

Industry Partners
CISCO, Intel, Netapp, Red Hat, Two Sigma, USAF, Dell, Fujitsu, Mellanox, Cambridge Computer, Lenovo, …

University Research IT Partners
BU, HU, NU, UMass, MIT, MGHPC

Data
BU, HU, NU, MIT, UMass, Foundations, Govt…

Core Team
OCX model, HIL, Billing, Intermediaries…

Cloud Technology
Operating Systems, Power, Security, Marketplace…

Users/applications
BigData, HPC, Life Sciences, …
Goals of Workshop

• Expose to ecosystem:
  – projects, services, interesting applications
• Enhance connections between different parts of the ecosystem
• Expose challenges and drive new requirements to core/researchers/partners
## Overview of Day

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## Five Hours of Micro-talks

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What’s Coming on the MOC

- **MGHPCC: A Platform for Collaboration** - Jim Culbert, MGHPCC
- **The Next Iteration of the MOC** - Lars Kellogg-Stedman, Red Hat
- **Intel’s Data Management Platform @MOC** - Dave Cohen, Intel
- **IBM’s Deep Learning Investment in the MOC** - Lori Bucciarelli, IBM
- **Cisco: Multi-cloud services for the MOC and its users** - Michael Shepherd, Cisco
- **Harvard Dataverse and the MOC** - Mercè Crosas, Harvard University
- **Using the Mass Open Cloud to perform Data Science Experiments** - Sherard Griffin, Red Hat
- **Looking towards the computing horizon: A Northeast Cyberinfrastructure Lab** - Wayne Gilmore, Boston University & Scott Yokel, Harvard University
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Research in an Open Cloud

• **Working on an Open Cloud: Red Hat Collaboratory Projects on the Mass Open Cloud** - Hugh Brock, Red Hat
• **Logging What Matters: Presenting Pythia and Just-in-Time Instrumentation** - Emre Ates, BU & Lily Sturmann, BU/Red Hat
• **The workflow motif: A powerful abstraction for debugging distributed applications** - Mania Abdi, NEU/MOC & Golsana Ghaemi, BU/MOC
• **Bump-in-the-Wire FPGAs and HPC in the Cloud** - Ahmed Sanaullah, BU
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Elastic Hardware and Security

- Creating Isolation in the Cloud - Nabil Schear, MIT Lincoln Laboratory
- Malleable Metal: Integrating San-booting with Foreman - Naved Ansari, BU/MOC & Ian Ballou, BU/MOC
- Agentless Bare-Metal Introspection - Apoorve Mohan, NEU/MOC
- The Security in Elastic Secure Infrastructure - Amin Mosayyebzadeh, BU/MOC
- Strong Isolation, Verification, and Control in Future Public Clouds - Rushi Patel, BU
- FLOCX: Enabling marketplace at the bottom of the cloud - Sahil Tikale, BU/MOC
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- **Medical Image Processing on the MOC with ChRIS and OpenShift** - Dan McPherson, Red Hat & Rudolph Pienaar, Boston Children’s Hospital
- **Secure Multi-Party Computing in the Cloud** - Ben Getchell, BU
- **FaaS: Think Outside the Container** - Tommy Unger, BU
- **A demonstration of adapting HW to SW needs for network workloads** - Han Dong, BU
- **A Unikernal based on Linux** - Ali Raza, BU & Parul Sohal, BU
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Roundtable Session – pick one

– Future Research Opportunities in the MOC
  • Facilitated by Ayse Coskun, BU; Raja Sambasivan, BU & Mayank Varia, BU

– Data Science and the MOC
  • Facilitated by Merce Crosas, Harvard University & Sherard Griffin, Red Hat

– Looking towards the computing horizon: A Northeast Cyberinfrastructure Lab
  • Facilitated by John Goodhue, MGHPCCC & Scott Yokel, Harvard University
Thank You

The MOC Workshop is made possible by the generosity of our Core Partners

Special Thank You to:
Two Sigma for Sponsoring the 2018 MOC Workshop Lunch
Red Hat for Sponsoring the 2018 MOC Workshop Reception