Hong Kong Open eXchange (HKOX)

Internet2 Global Summit

May 2018

www.hkox.hk

HKOX Background

- HKOX is set up and managed by Joint Universities Computer Centre (JUCC)

- JUCC is a consortium of computing and IT services centres of all the government-funded universities in Hong Kong founded in 1970

- Strategic mission of JUCC:

  - Support Academic and Research Excellence
  - Provide Advanced Research and Education Networks in Hong Kong (*HARNET - The Hong Kong Academic and Research NETwork*)
  - Develop Hong Kong as an Internet Hub for Leading-edge Research in the Region

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HKOX Objectives

- Collate stakeholders (R&E network operators, universities and researchers, carriers, government) to a community and strengthen HK's position as a R&E regional hub in the Asia Pacific region
- Enable HKOX community to participate in high-impact world wide research and education activities that are data-intensive/bandwidth intensive (e.g. HK faculty members participating in particle physics, genomic research, meteorology, telemedicine, etc.)
- Consolidate NREN's connection for better collaboration and performance
- Act as test bed for new Internet protocols and architectures before deployment within the Public Internet.

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R&E Projects

- HKUST-MIT Research Alliance Consortium
  - Build up a network for local universities and leading technology companies to collaborate with their international counterparts on future advancement in high-tech research.

Cluster Level	Internet-of-Things (IoT) for Intelligent Buildings & Transportation	Data Science & E-learning Research	Advanced Manufacturing	Biomedical Systems
Potential Area of Interests	• Internet of Things (IoT) • Next generation of mobile phone • Device-to-Device communication (D2D) • Micro-electronics and Embedded System Design • Advanced Protocols and Network Intelligence • Integration of Optical and Wireless Networks • Smart Control Systems - Lighting - Indoor Air - Drinking Water - User Experience, Privacy/ Security Application • Low-Power Sensor Technologies & Design • Smart Building Materials	• Design and development of e-learning platform • Learning analytics on structured and unstructured data • Crowdsourcing and social network for education purpose • Knowledge mining from e-learning content • Bridging big data analytics and behavioral sciences	• Robotics and Automation for Advanced Manufacturing • Additive Manufacturing • Mass Customization	• Wearable Monitors • Point of Care Instruments • Personal Imaging Ultrasound/MRI • Bioinformatics • Genomics

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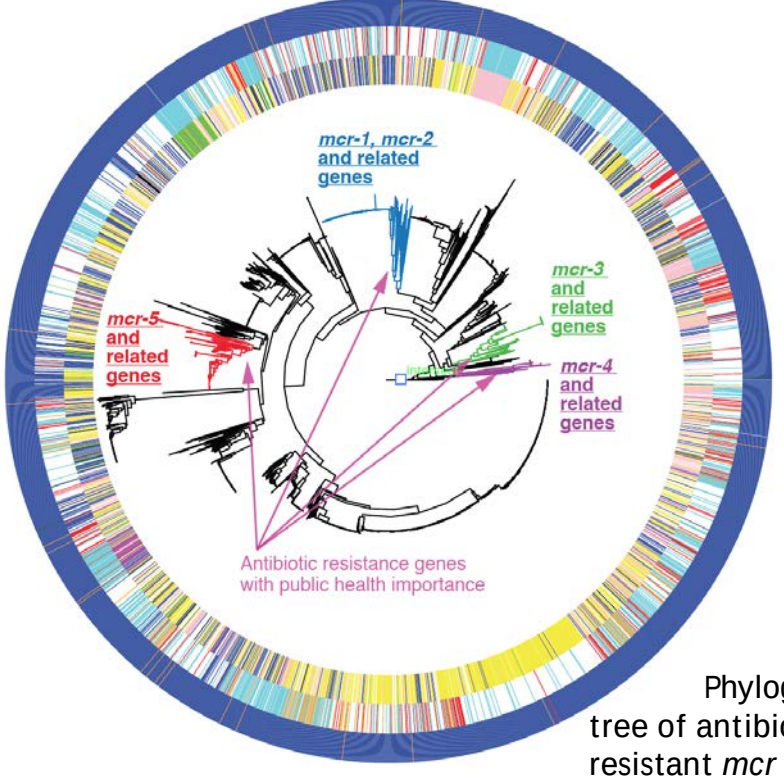
R&E Projects

- HKU School of Public Health: Mining the Antibiotic Resistance Genes
- **Objective:** To investigate the global distribution of different antibiotic resistance genes (ARGs), and study their evolution and emergence.



Phylogenetic tree of antibiotic-resistant *mcr* and related genes

- Research using genome datasets from US databanks (National Center for Biotechnology Information, ChicagoU and Argonne National Laboratory).
- **Genomic Datasets:** RefSeq, nt/nr, WGS, SRA databases from *National Center for Biotechnology Information* (www.ncbi.nlm.nih.gov) and the MG-RAST metagenomic database (www.mg-rast.org) from *The University of Chicago* and *Argonne National Laboratory*.

CUHK Signs Agreement with CERN to Enable Physics

- Chinese University of Hong Kong (CUHK) setup a HPC Cluster linking with CERN HPC Cluster for physics calculation and analytics
- HPC Cluster Configuration:
  - 18x worker node with 1008 Cores
  - 3x DPM disk nodes (436TB)
  - 4x DPM disk nodes (654TB) – to be deployed in summer
- Future Plan: Optimize the network by LHCONE peering

HKOX Equipment

- Juniper MX10003 (Up and running since Mar-2018)
- Comply with GNA specifications
- Support GE, 10GE, and 100GE ports
- Locate at MEGA-i 10/F
- Easy to cross connect to most of the NREN and commercial terminations already present in MEGA-I
- Services: Layer 2, Layer 3 peering
  Bilateral/Multilateral peering
  Vlan tagging (802.1q), Vlan provisioning
  Jumbo Frames
  Network Performance Tools – MRTG, perfSONAR

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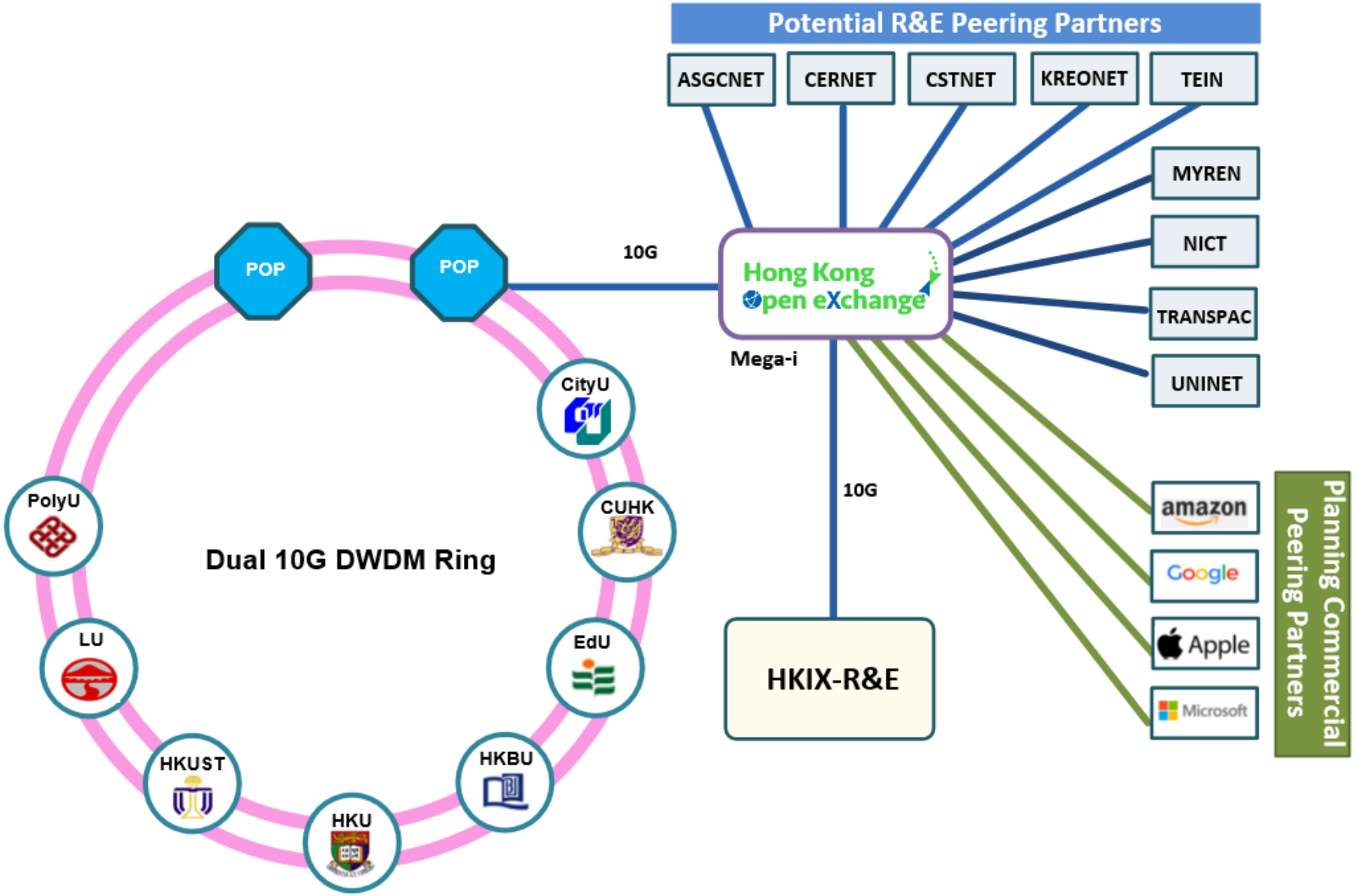

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HKOX Planned Activities

- Comply with the Open Exchange Requirements for the Global Network Architecture (GNA)
- Using perfSONAR to measure and analyze the performance and utilization on the links between NRENs
- Upgrade HARNET – HKOX link from 10G to 100G
- Arrange bilateral meetings with NERN partners
- Members will regularly update HKOX progress on upcoming TNC18, and APAN46, etc. events

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Thank You

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