NDFIS
National Dark Fibre Infrastructure Service

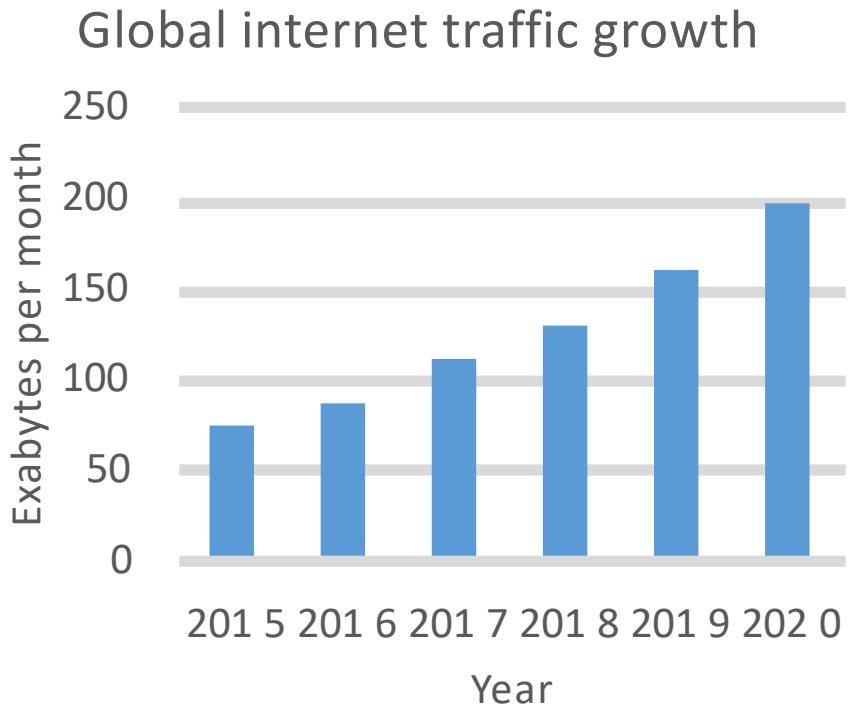
Introduction to the National Dark Fibre Infrastructure Service

Will Yang
Facility Manager of NDFIS
UCL

Alwyn Seeds
Director of NDFIS
UCL

Need for NDFIS – background

Supply vs. Demand



- Compound annual growth rate of 23% (Cisco 2016). Expected to saturate the lit fibre network by 2020

Mobile network

- In 2015, wired devices accounted for 52% of the IP traffic
- By 2020, wireless and mobile devices will take up 66% of the IP traffic

Content

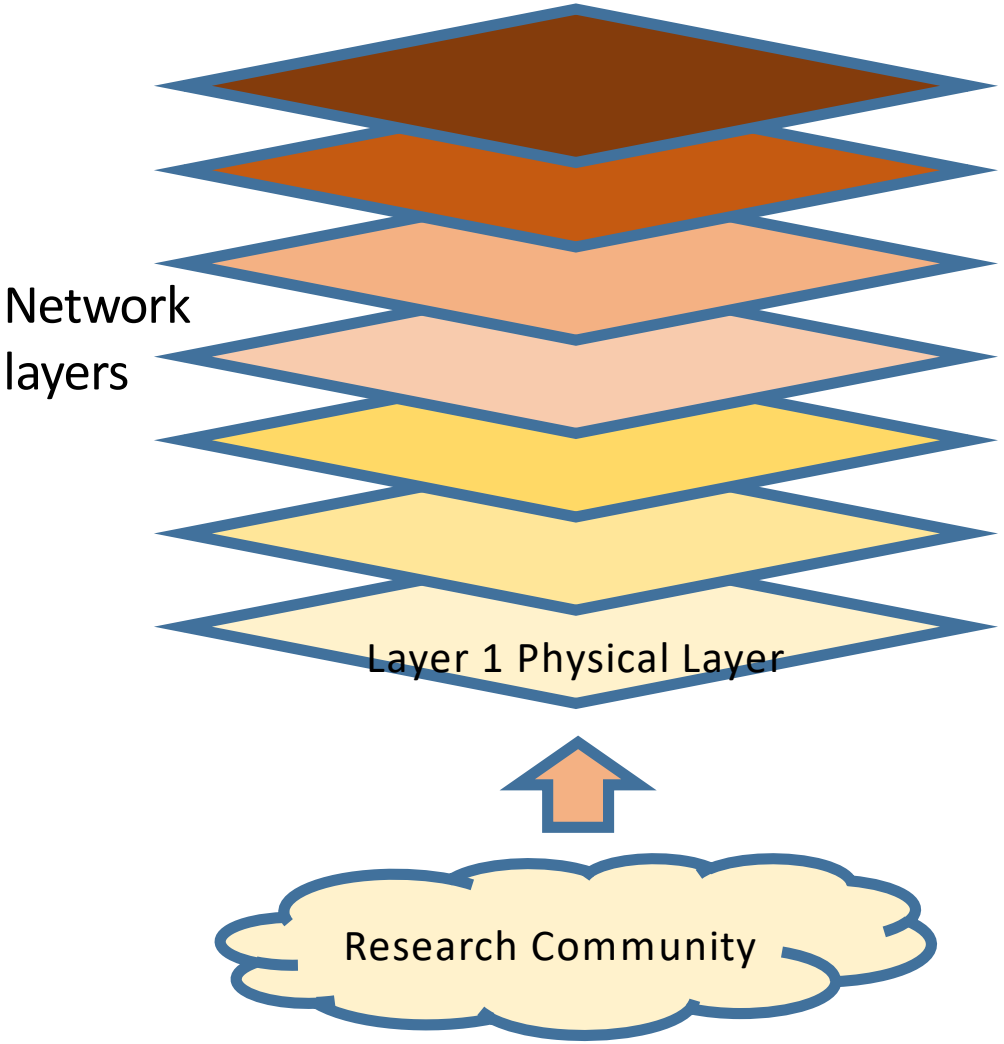
- Internet video (82% of the IP traffic by 2020)
- Virtual reality (x4 in 2015)
- Internet gaming (x7 in 2015)

Future network research in light of the challenges:

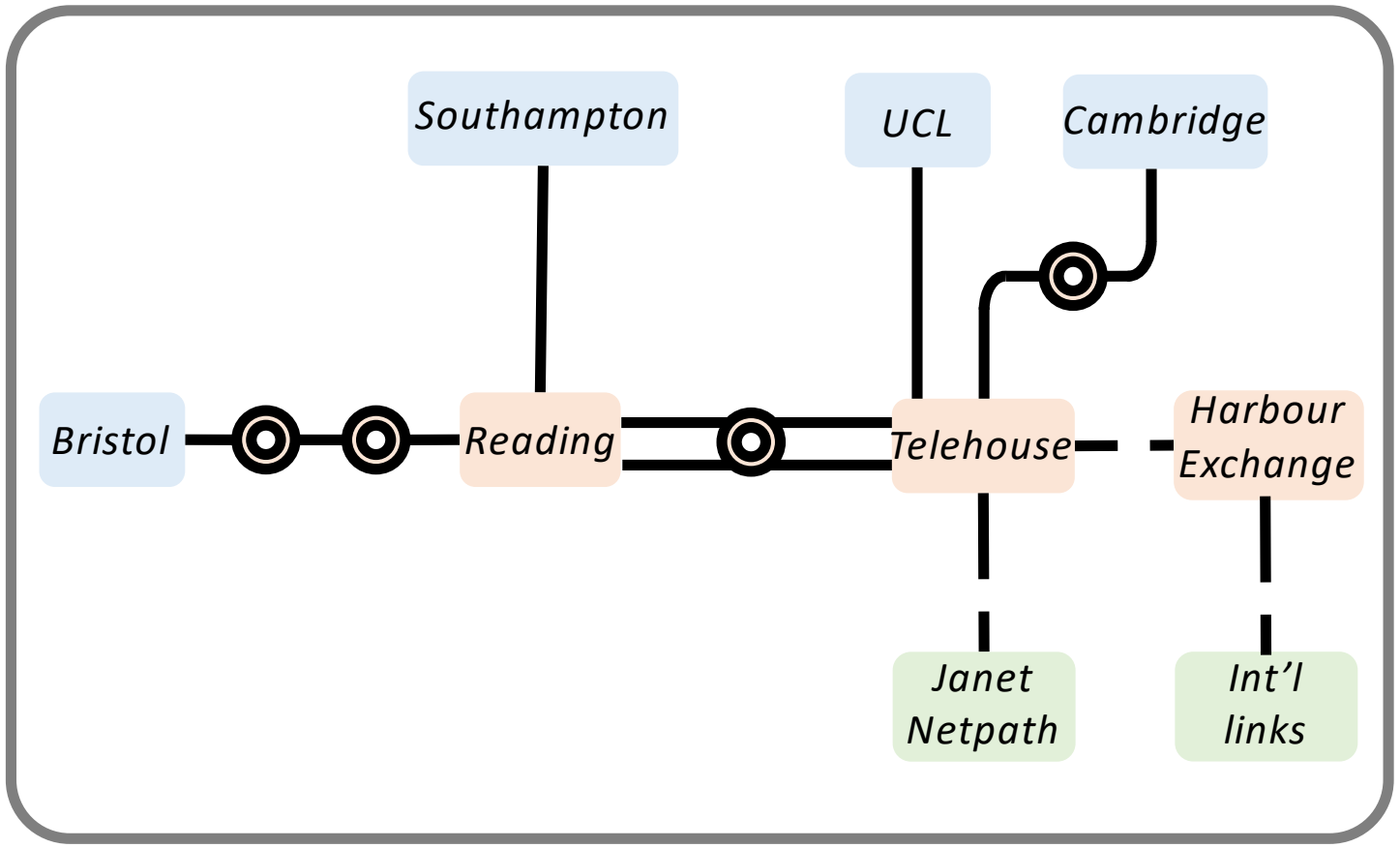
- Growing demand for internet capacity
- Hybrid, converged network consisting of wired and wireless networks, backbones and access networks
- Demanding user Internet content- latency and QOS issues
- Research collaboration is essential

What is NDFIS?
A Network Research Facility

- Access points & major interconnection
- Colocation

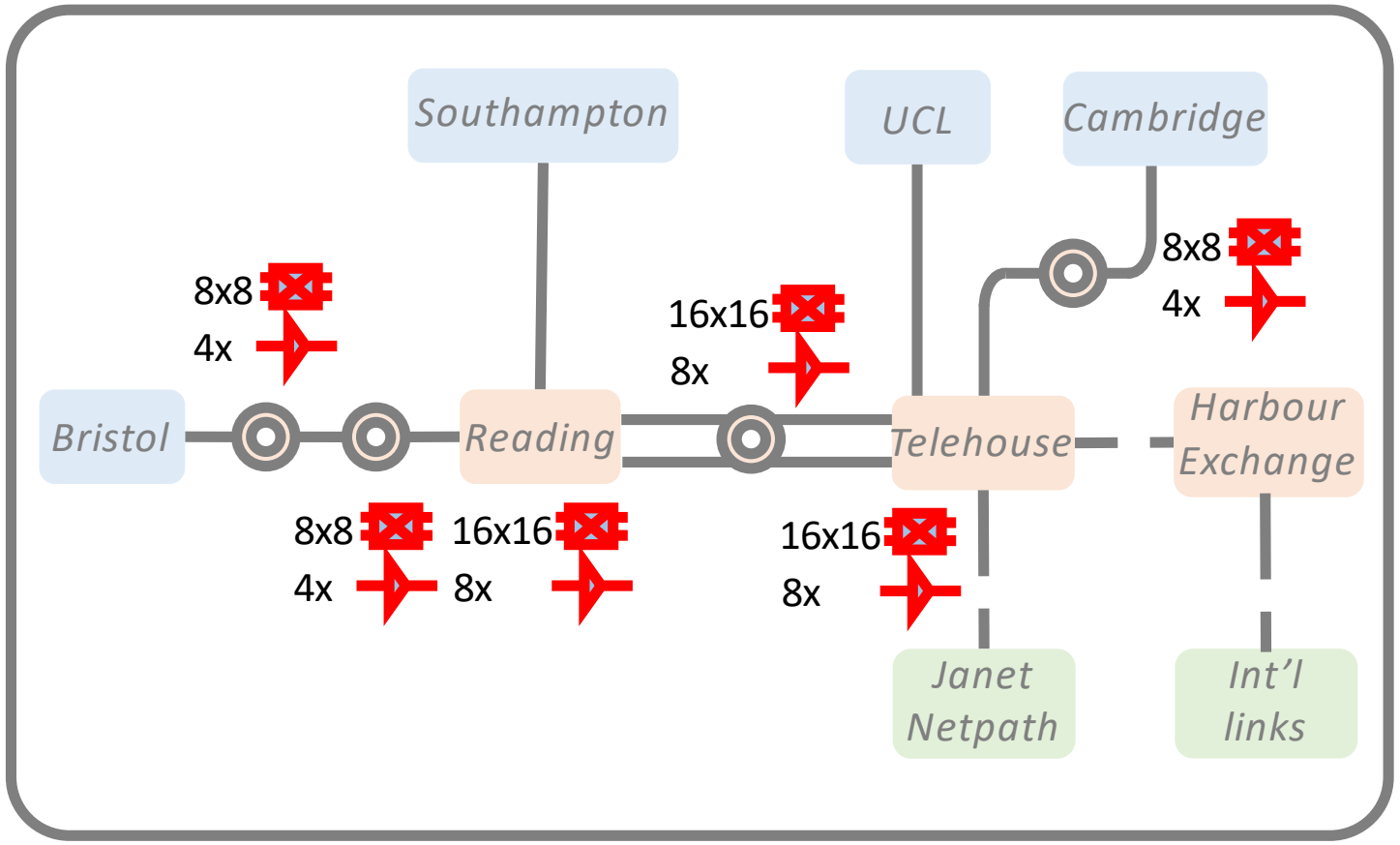


What is NDFIS- Reach?



- 630 km of single mode fibre
- 4 Access sites
- 3 Major interconnection points
- 4 Colocation sites

What is NDFIS- Technology?



- All nodes have optical switches and amplifiers installed.
- All nodes have switchable optical dispersion compensation

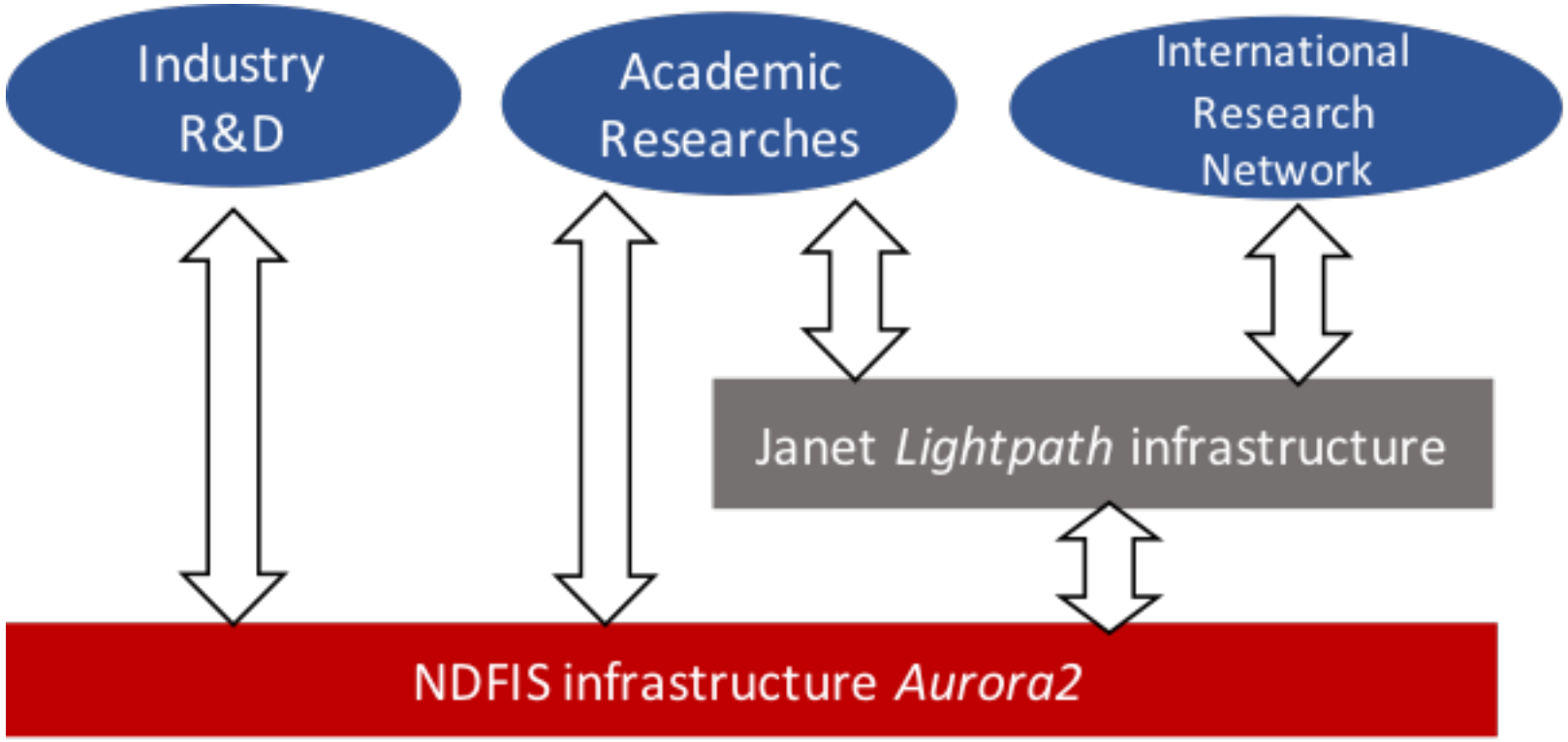
Polatis

LeaPhotonics

Upgrade: wavelength switching

10 Gbit/s SFP+, switch to host up to 48 channels

How to access NDFIS?



What is NDFIS? – Consortium

The National Dark Fibre Infrastructure Service (NDFIS) is an Engineering and Physical Sciences Research Council (EPSRC) National Research Facility, established in 2014 to support researchers in developing the underpinning communications technologies for the future internet.

Professor
Alwyn Seeds

Director

UCL

Professor
Periklis
Petropoulos

Director

Southampton

Dr David Salmon
Director
JISC

Professor
Richard Penty

Director

Cambridge

Professor
Dimitra
Simeonidou

Director

Bristol

What is NDFIS? – Key features

- Installed fibre
- University access
- Interconnection with other facility (proposed)
- Flexgrid (in progress)

- Programmability
- Layer2 networking
- SDN platform
- Distributed and Edge Processing
- Security and resillience

Need for NDFIS – applications

- Optical communications
- Wireless research
- Next Generation Internet (NGI)
- Quantum Communication
- Immersive and Virtual Reality
- Precision Time and Frequency Distribution

Research summary

15 projects and 42 research groups

76 direct users

A total value of EPSRC grants of £47.2m, together with European grants of €8.4m.

RIIE projects

45 research outputs have been produced in 2016 and 2017.

TOUCAN
ULTIMATE NETWORK CONVERGENCE

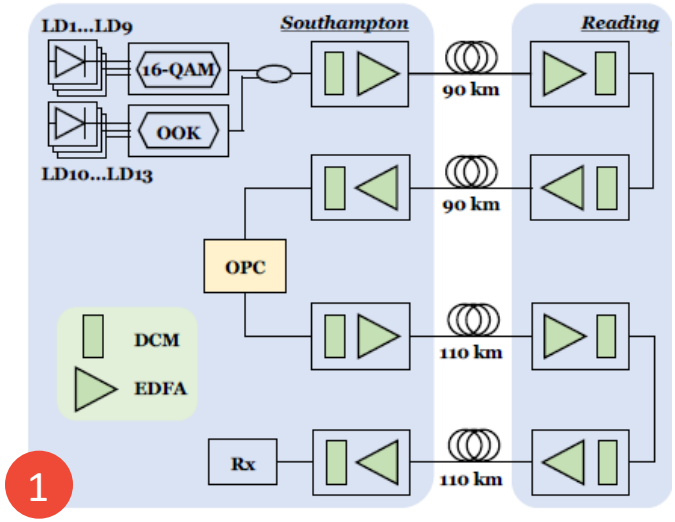
UNIQC

QUANTUM COMMUNICATIONS HUB

EPSRC
Engineering and Physical Sciences Research Council

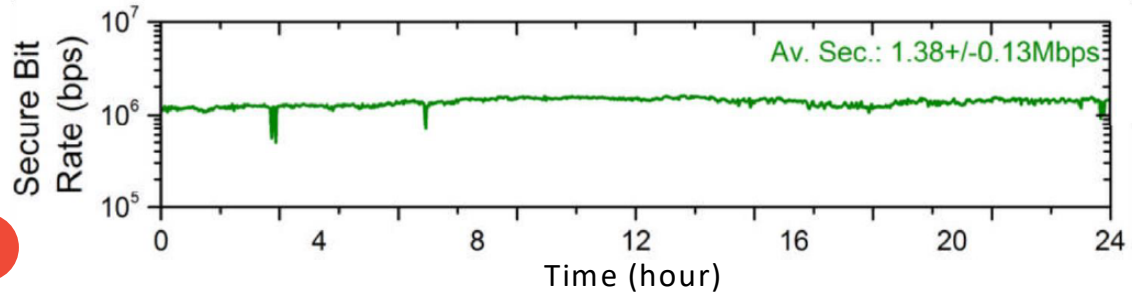
NPL
National Physical Laboratory

Research projects



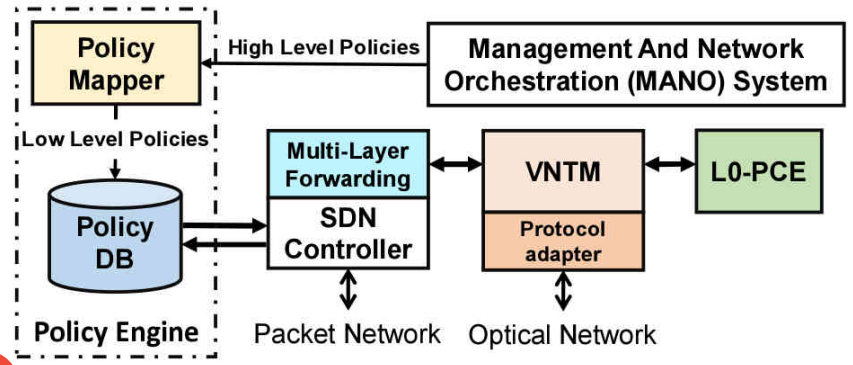
1

Optical phase conjugation
P. Petropoulos *et al*, Southampton



2

Quantum key distribution
I. White *et al*, Cambridge & Toshiba



3

SDN end-to-end network provisioning
D. Simeonidou *et al*, Bristol

4

RIIE projects (interconnected testbeds):

- Virtual reality data over a low-latency network (CASMS)
  Anthony Steed, UCL
  Alan Marshall, Liverpool
- Converged network (COALESCE)
  Martyn Fice, UCL

How to access NDFIS?

Contact Will Zhen.yang@ucl.ac.uk

http://www.ndfis.org/

Writing a proposal:

- Please contact NDFIS beforehand for quote

Planning an experiment:

- Get in touch via email
- Submit a formal access form
- Schedule and gain access

NDFIS
National Dark Fibre Infrastructure Service

Thank you!

NDFIS website: http://www.ndfis.org

Contacts: zhen.yang@ucl.ac.uk
a.seeds@ucl.ac.uk