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JANET / UKLight Monitoring

David Salmon

UKERNA -> changing

Background From Last meeting
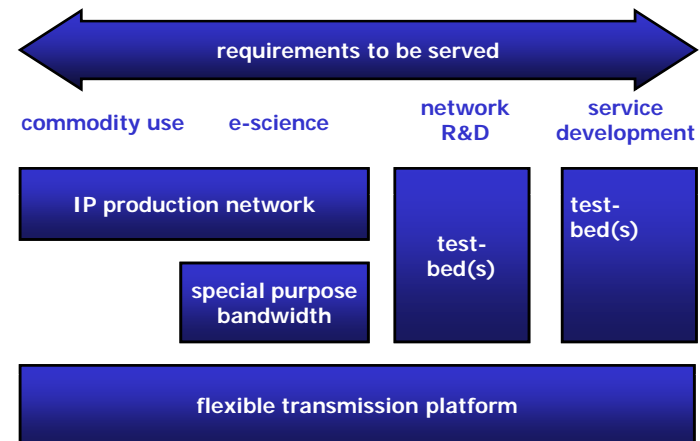
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- MASTS Project established to do some monitoring on UKLight
    - MASTS – Measurements at All Scales and TimeS
    - At the time – had thought of inviting MASTs to speak
    - More details later
- Network Researchers with and interest in analysing Traffic patterns & behaviour
- Developing systems & tools to capture, filter and store traffic

- LCG Traffic RAL-CERN started on UKLight – 4 * 1Gb/s
- Now moved to dedicated 10Gb/s path – brief update from Robin Tasker
- MASTS now aim to monitor this link too
    - Possibly the richest traffic mix over a dedicated path

SuperJANET5

Requirements

Reliability	improve by building in more resilience
Scalability	ability to increase bandwidth at controllable cost
Separability	protection of interests of teaching & learning and research sectors
Flexibility	responsiveness to additional network service requirements
Visibility	controlled access to network monitoring and measurement information by end users

SuperJANET5 Architecture

Main areas of activity

- JANET
  - New JANET-wide system to replace Netsight
  - Statistics from all the backbone and access links
  - Reasonable access to data for all
  - Will incorporate GRIDMON & UKLight path status
- Community
  - MASTS project and network research groups
  - Deeper capture and & subsequent analysis

Monitoring on JANET

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Netsight2

- Current Netsight
  - Collectors (bespoke) at ~20 regional networks
  - People can log on and look at status and traffic information
  - Some information restricted to local users
- New Netsight 2
  - Procure a better more integrated system
  - Database of measurements
  - Access for network managers and community
  - Being designed...
  - Integrate GRIDMON systems (UK e-Science – Robin Tasker & Colleagues at DL)
  - Specification document on web
- Suspect many NRENs doing similar projects

Legal Issues

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- Human rights act
  - right to private communications
- Two other Statutes of particular relevance
  - (mention standard caveats re expertise !)
- RIPA – Regulation of Investigatory Powers Act
- DPA – Data Protection Act
- RIPA covers the circumstance under which network traffic can be acquired (logged etc)
- DPA covers appropriate handling of the data once you have it

RIPA

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- Network operators can look at traffic on their own network for:
  - Operational purposes - e.g. fault detection
  - Business purposes – e.g. AUP conformance
    - Users need to be notified
- 3rd parties (e.g. researchers) can not independently monitor traffic
- Need to accommodate this by establishing a formal relationship between network operators (UKERNA) and any groups undertaking monitoring on our behalf
- If approved, UKERNA contracts the 3rd party to do the monitoring & legally binds them to defined activities and data handling procedures

DPA

- Protection of personal data
- Anything which identifies end-systems
  - IP addresses – so requirement to anonymise
- Access to raw (non-anonymised) data
- & Access to true data content (not headers)
  - Not impossible, but need to make a very strong case to be able to look at this
  - Much more stringent data handling requirements

Monitoring Framework

- UKERNA has drafted a policy on access to traffic data
  - Andrew Cormack in consultation with the research community
- UKERNA can contract researchers to undertake measurement & monitoring work
  - Data acquisition & handling well defined so that RIPA and DPA are respected
- Contract drawn up in consultation with Lawyers
  - Working with MASTS as the first case of using it

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Documentation

- Background information
- Policy document
- Draft contract
- Will be published on our web site (www.ja.net)
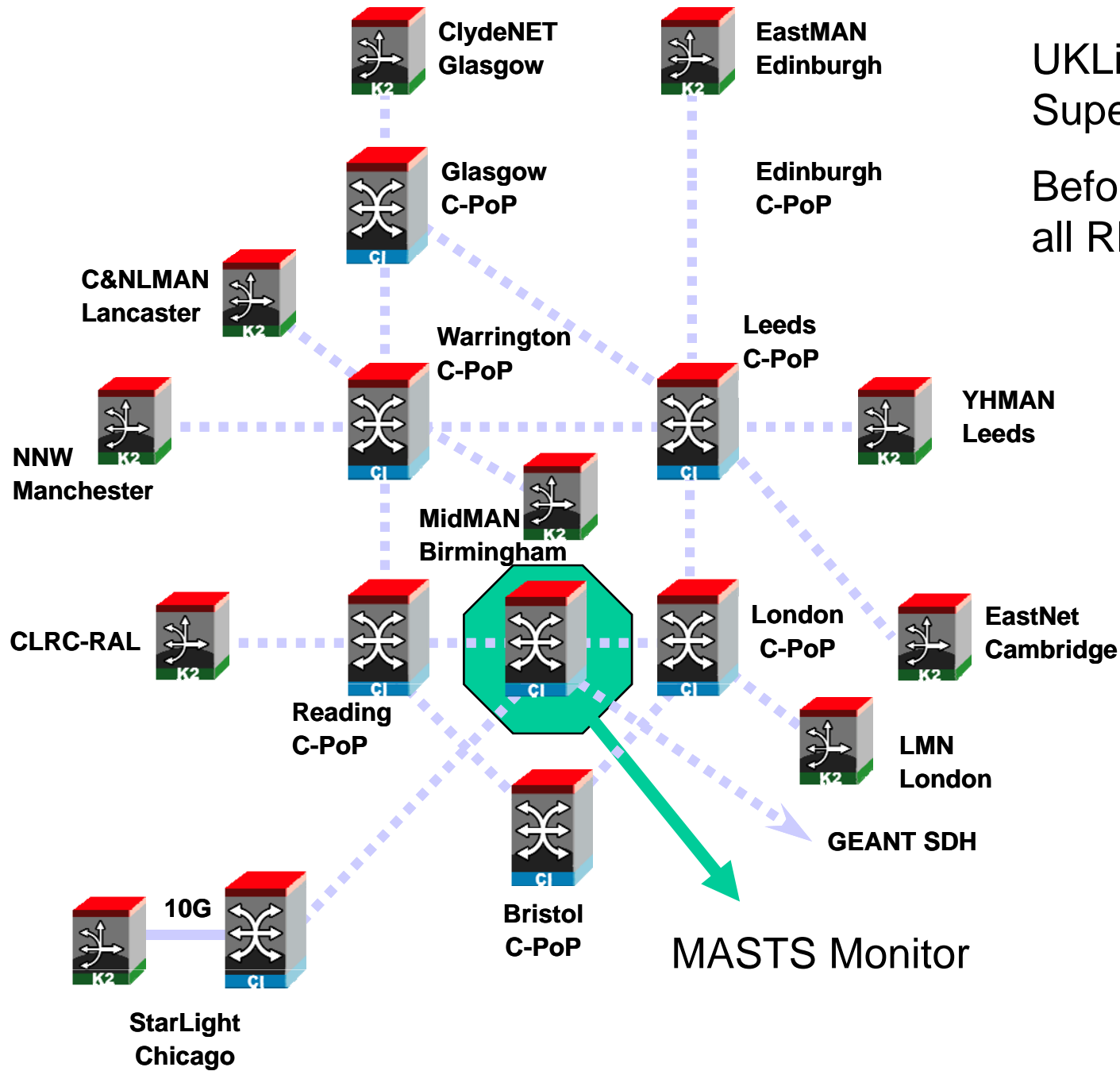   - May already be there...
    - Don't have URL

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MASTS

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MASTS Research Objectives

- Understand Network usage & changes with time
- Understand traffic/application stream interactions & impact on network
- Effect of user knowledge of network state on usage patterns
- Impact of network changes on users network use (behaviour)
- Anomaly detection (traffic/use patterns)
- Identifying network abuse
- Network and Application profiling

MASTS

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- Data required
  - Generally IP packet header information
  - Possibly flow information

- Monitoring points
  - UKLight London - started as a UKLight project
  - Moving on to JANET IP service
  - Following the RAL-CERN Link

ClydeNET
Glasgow

EastMAN
Edinburgh

UKLight on
SuperJANET5

Before extension to
all RNs

Glasgow
C-PoP

Edinburgh
C-PoP

C&NLMAN
Lancaster

Warrington
C-PoP

Leeds
C-PoP

NNW
Manchester

YHMAN
Leeds

MidMAN
Birmingham

CLRC-RAL

London
C-PoP

EastNet
Cambridge

Reading
C-PoP

LMN
London

GEANT SDH

10G

MASTS Monitor

Bristol
C-PoP

StarLight
Chicago
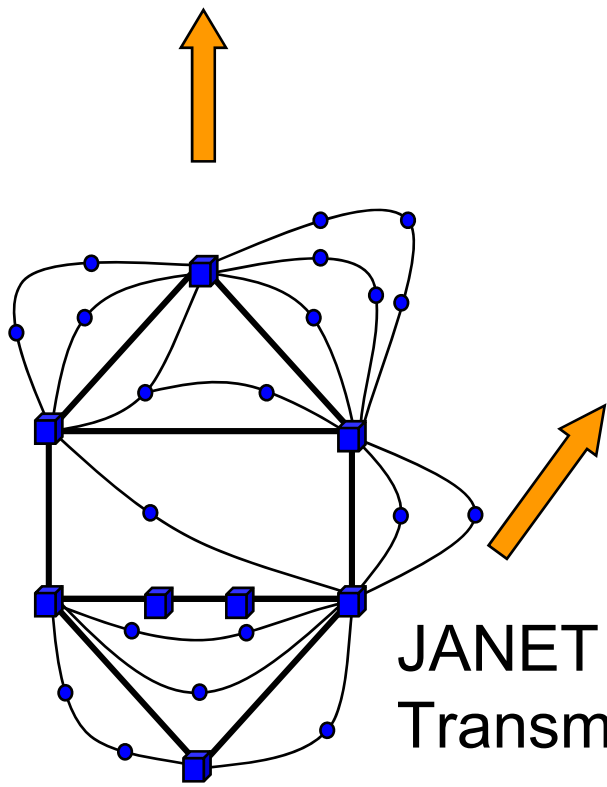
UKLight circuit monitoring

- Original idea to use optical splitters
  - MASTS use Endace capture cards
    - Don't understand fully structured SDH
    - Don't understand GFP
  - Core directors use Flexible Concatenation (non-standard) between themselves for efficiency
- Move to using ESLMs
  - standard 10GE & VLAN tags)
- CoreDirector software features
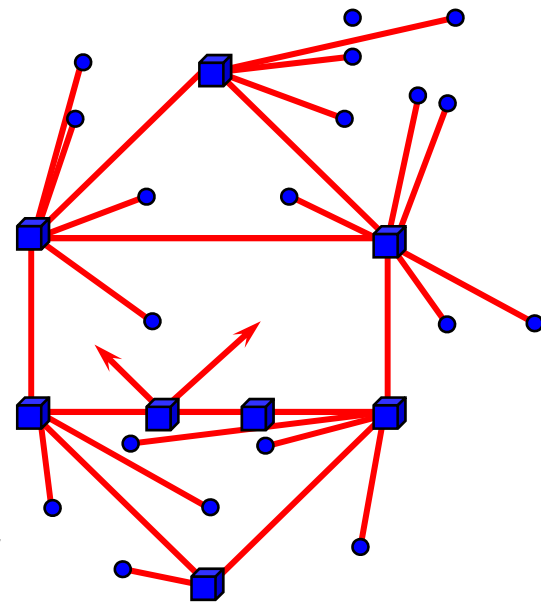- Can replicate traffic streams to the ESLMs

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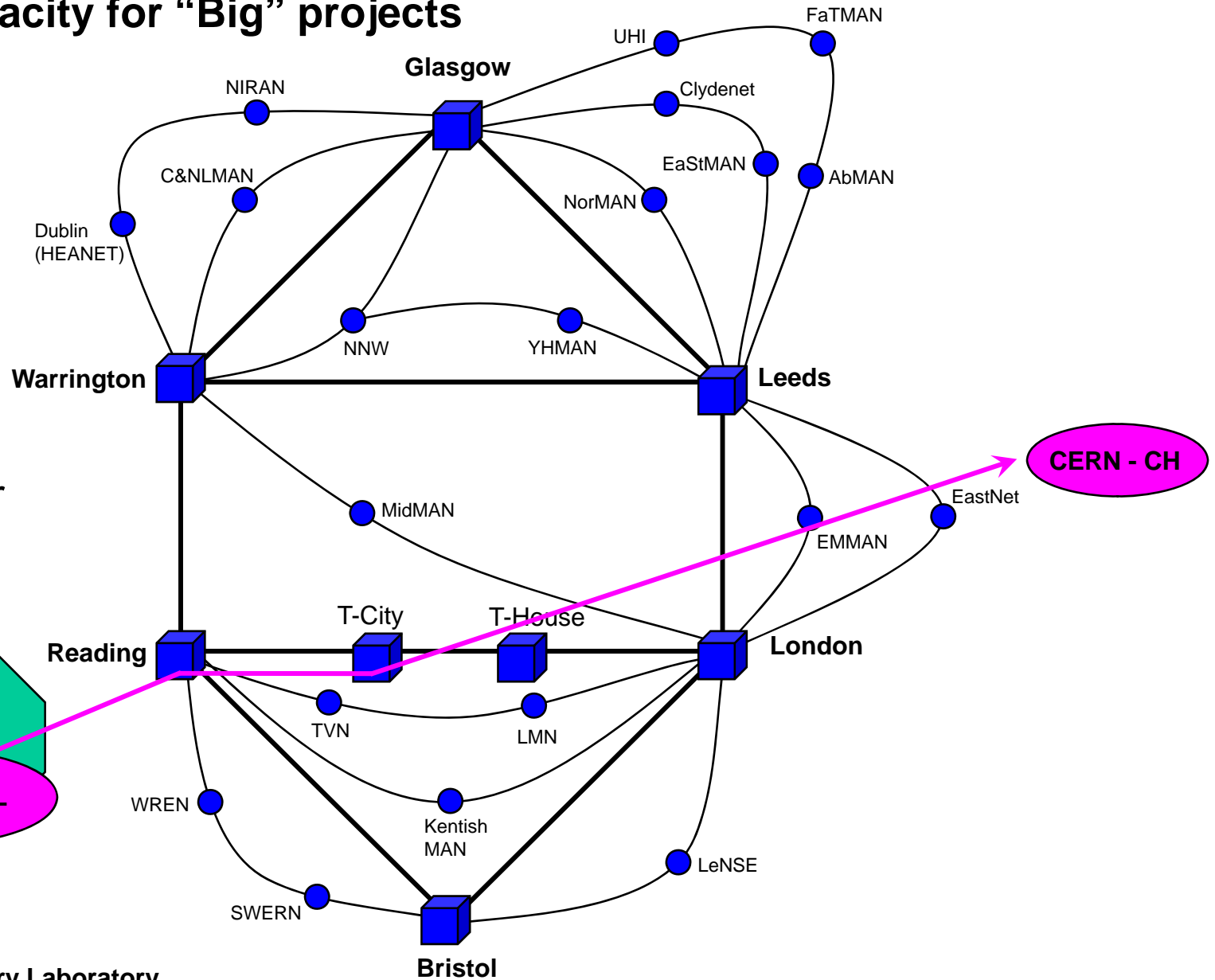JANET IP

Additional
Wavelengths

Research capacity
UKLight
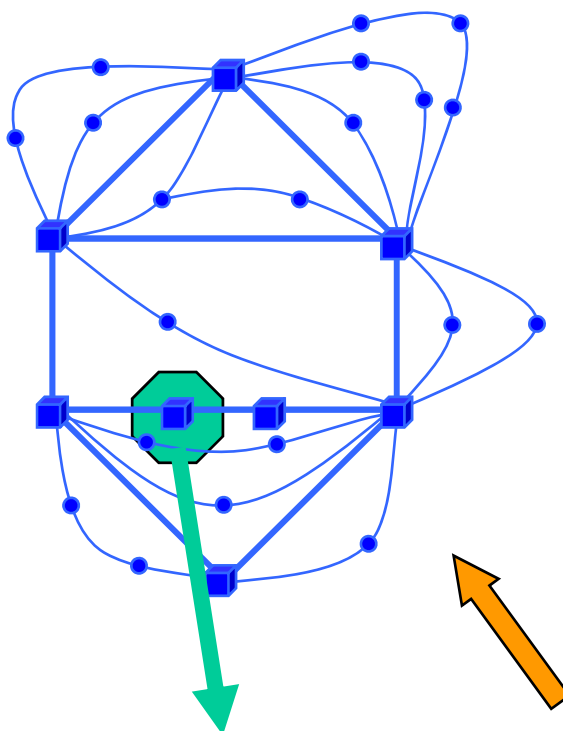
MASTS Monitor

JANET Optical
Transmisson

Additional capacity for "Big" projects

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MASTS Monitor

Glasgow

FaTMAN

UHI

Clydenet

NIRAN

C&NLMAN

EaStMAN

AbMAN

NorMAN

Dublin (HEANET)

NNW

YHMAN

Warrington

Leeds

CERN - CH

MidMAN

EastNet

EMMAN

T-City

T-House

Reading

London

TVN

LMN

CCLRC - RAL

WREN

Kentish MAN

LeNSE

SWERN

Bristol

10Gb/s wavelengths at the op   **layer**

Summary – Relevance to LCG OPN ?

- Auditing ?
  - views may differ on what this means
- JANET
  - RAL-CERN Lightpath Status Information – being implemented
  - Basic traffic statistics from JANET systems will come
    - Of course RAL & CERN can monitor their ends too !
  - MASTS analyses may bring interesting information in the longer term
    - probably goes well beyond what people want/need currently

Further Information & Contacts

- NB I'm not the expert here !
- JANET
    - Measurements – Steve Williams (S.Williams@ukerna.ac.uk)
    - Legal – Andrew Cormack (A.Cormack@ukerna.ac.uk)
    - www.ja.net development web pages
- MASTS
    - www.masts.uklight.ac.uk
    - David Parish, Iain Phillips, Andrew Moore, Miguel Rio & colleagues at Loughborough, Cambridge and UCL