

VISUALISING EDUROAM

**What we can do now, what
we need to do in the future**

...and a trivial afterthought

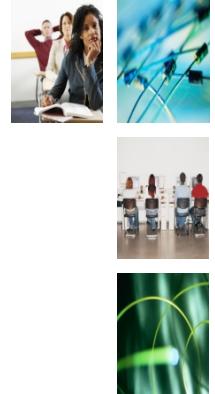
Mark O'Leary
June 2010

AGENDA

- Free effort?
- Visualising eduroam
- Transition to RadSec
- Restoring visualisation: IF-MAP
- Trivial solution?



FREE EFFORT?



- An NREN's primary role is delivery of the network
- But we do try to be members of the **broader educational community**
- Arguably, there is a 'social responsibility' obligation on us to provide **opportunities for student engagement** with our activities

FREE EFFORT?



- University IT courses increasingly use **‘real-world’ project activities** to provide students with experience
 - The University of Southampton runs a five week ‘Group Design Project’ for MSc students each year
 - JANET(UK) **‘plays the customer’** for a GDP team
 - 3rd year of collaboration

FREE EFFORT?

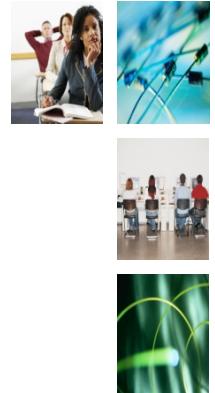


- We specify an *achievable* task with a programming component
- The students do the work, and communicate their ongoing management of the project
- We provide feedback that contributes towards their assessment
- Valuable learning experience and useful deliverables: **win-win!**

FREE EFFORT?

GDP 08/09

- Wireless Location Awareness

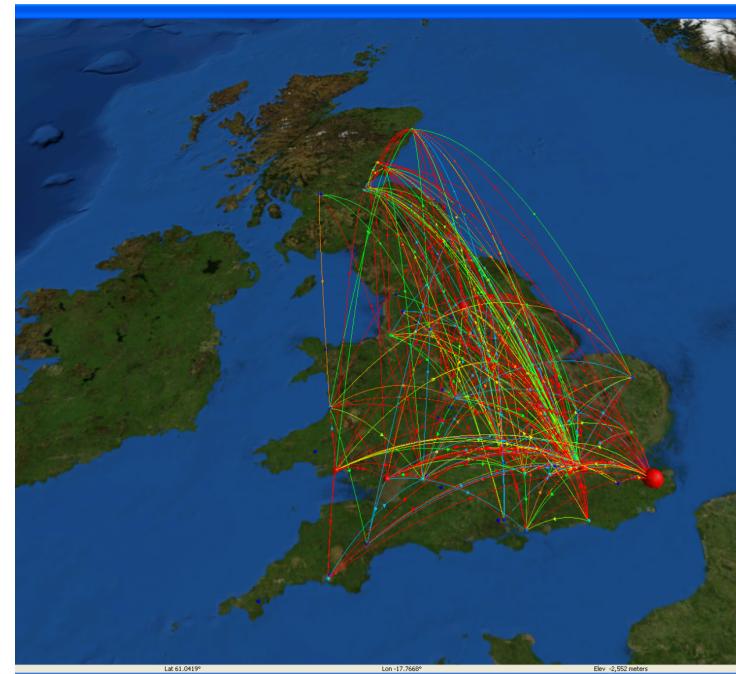


FREE EFFORT?

GDP 09/10

- Visualising eduroam

- Thanks to:
 - Sam Miller
 - Dan Stoner
 - Richard Clarke
 - Lesley Oakey
 - Dr Tim Chown

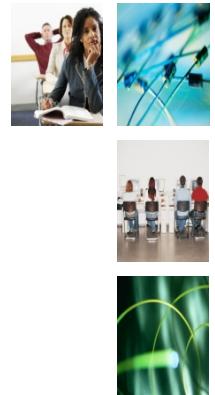


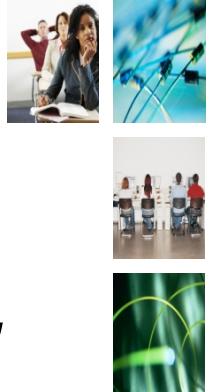
FREE EFFORT?



GDP 10/11

- Another eduroam-related project
- *Watch this space!*

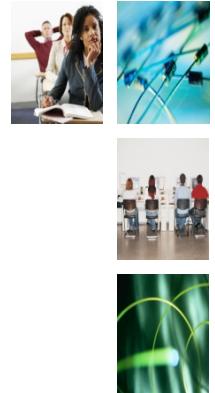




WHY VISUALISE DATA?

- *“A picture is worth a thousand words”*
- The pattern of eduroam transactions is complex
 - difficult to spot even broad trends
- Is eduroam successful?
 - A fundamental question.
 - possibly more of a talking point in the UK than elsewhere?

GOALS OF VISUALISATION



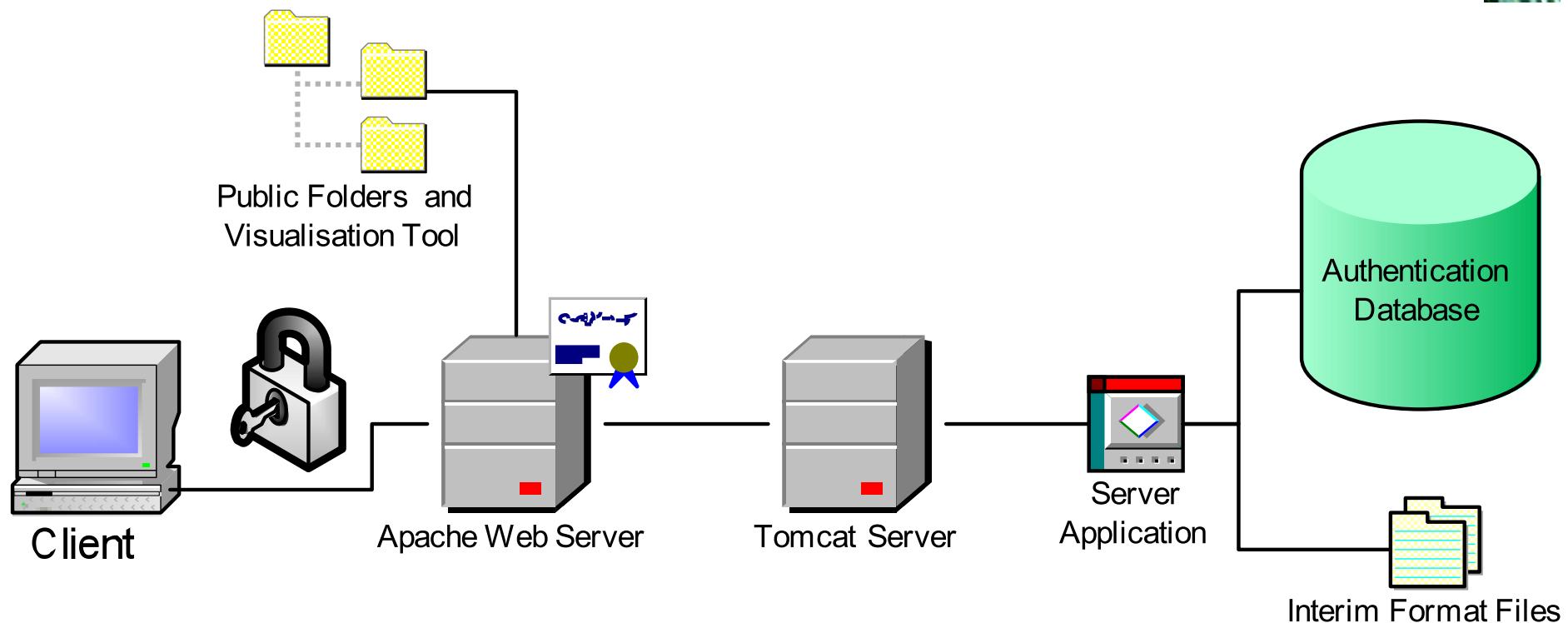
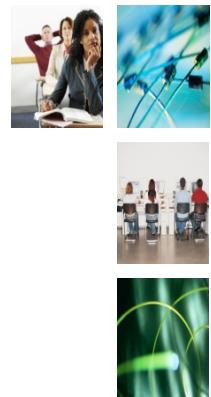
- Analytical
 - Usage patterns & levels
- Diagnostic
 - Error conditions highlighted,
geographically located
- Promotional Tool
 - Compelling picture of usage
 - Unattended demo mode

CAVEATS

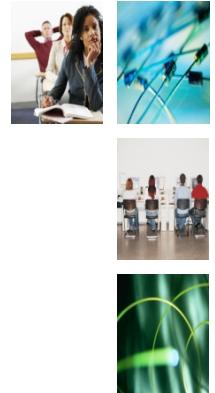


- Privacy protection: don't display data that allows an individual users travels to be inferred.
 - **Blurring:** temporal aggregation
 - **Blurring:** image manipulation techniques
 - **Authorisation:** role-based data release policies

DESIGN



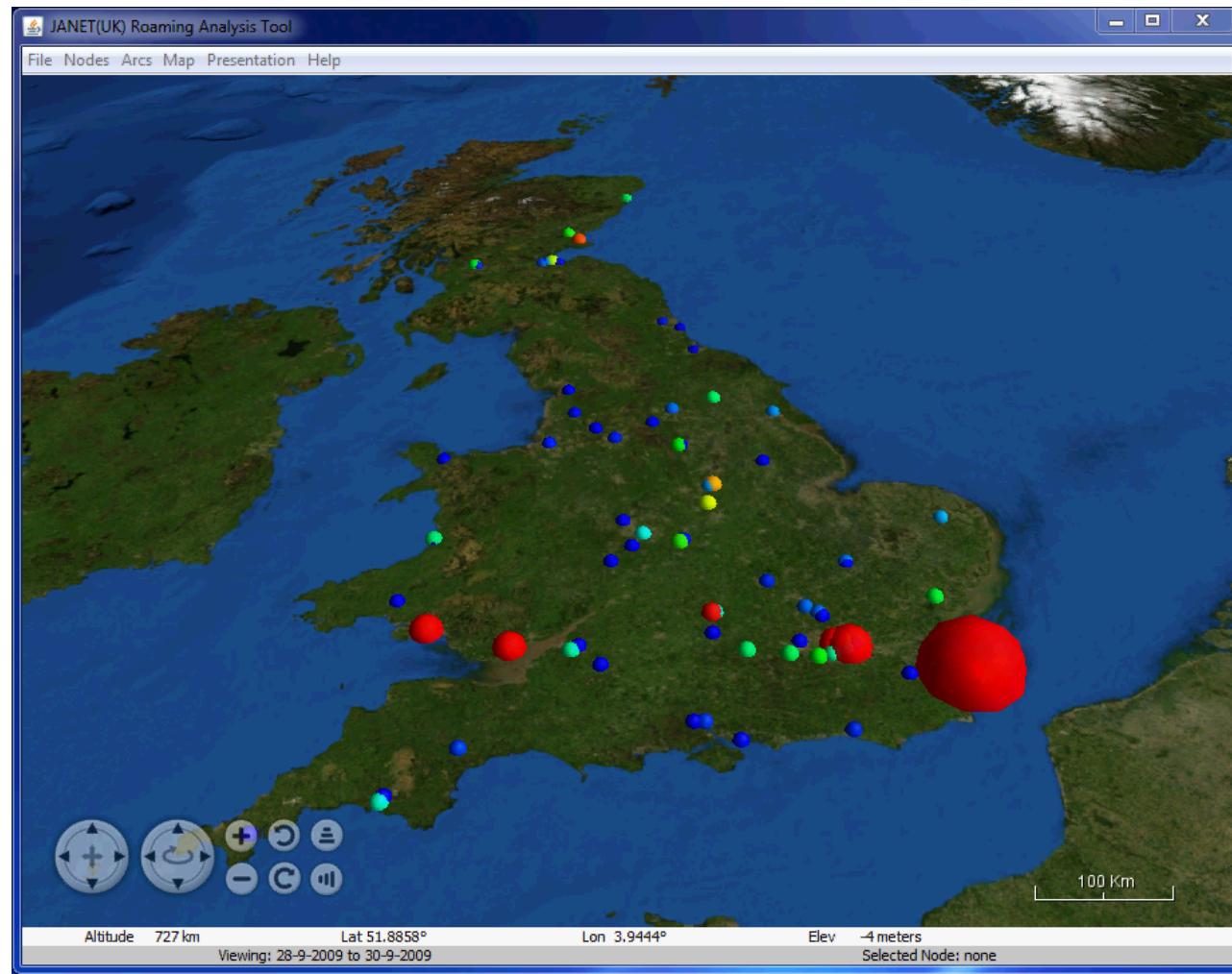
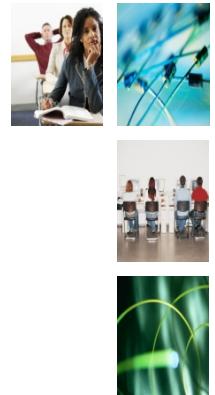
DEMONSTRATION



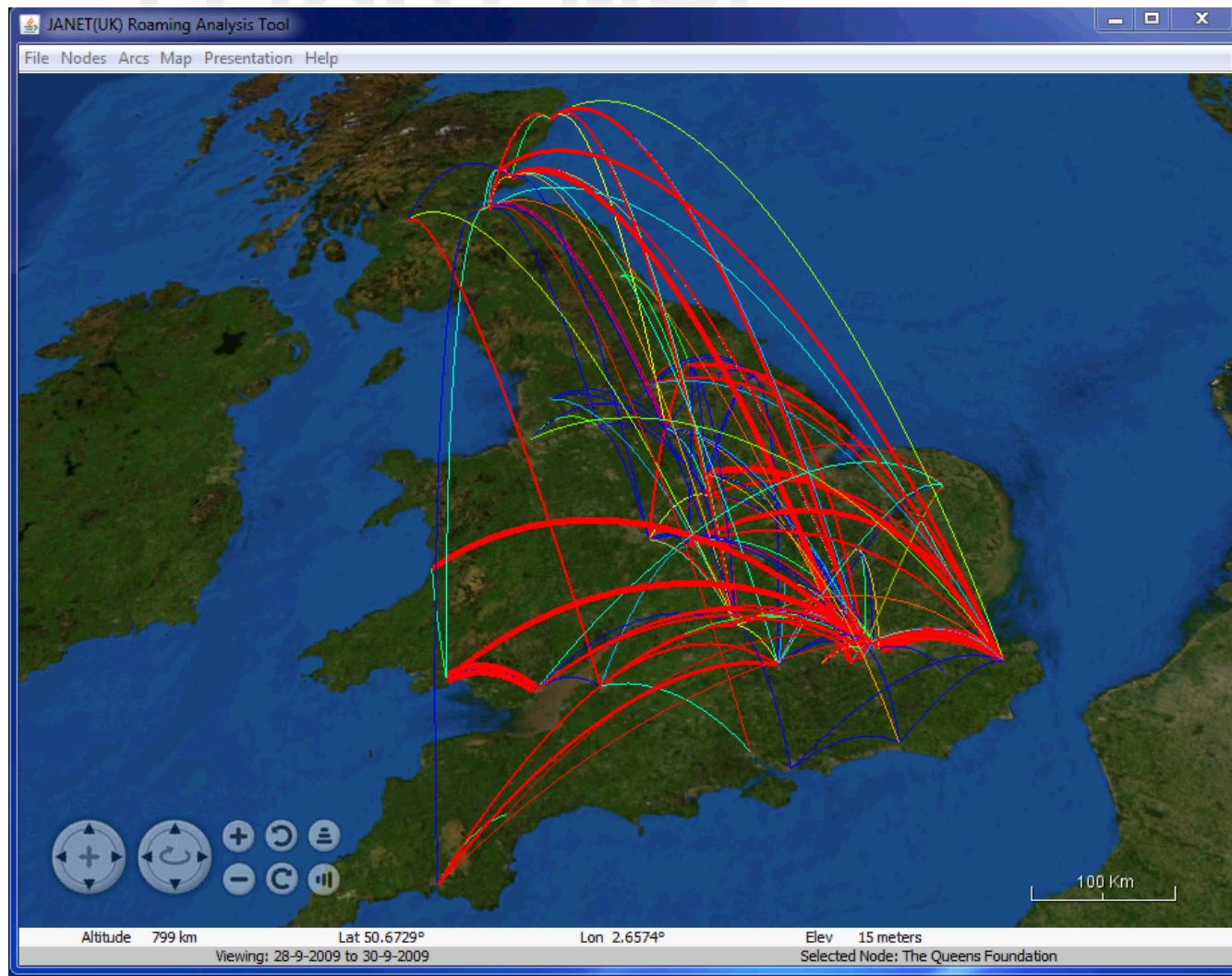
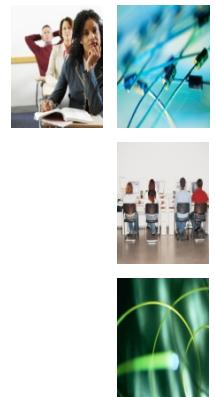
- Roaming sites
- 'Flight map' transaction arcs
- Bar chart activity monitoring



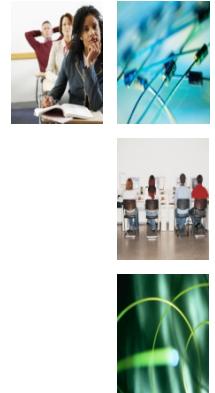
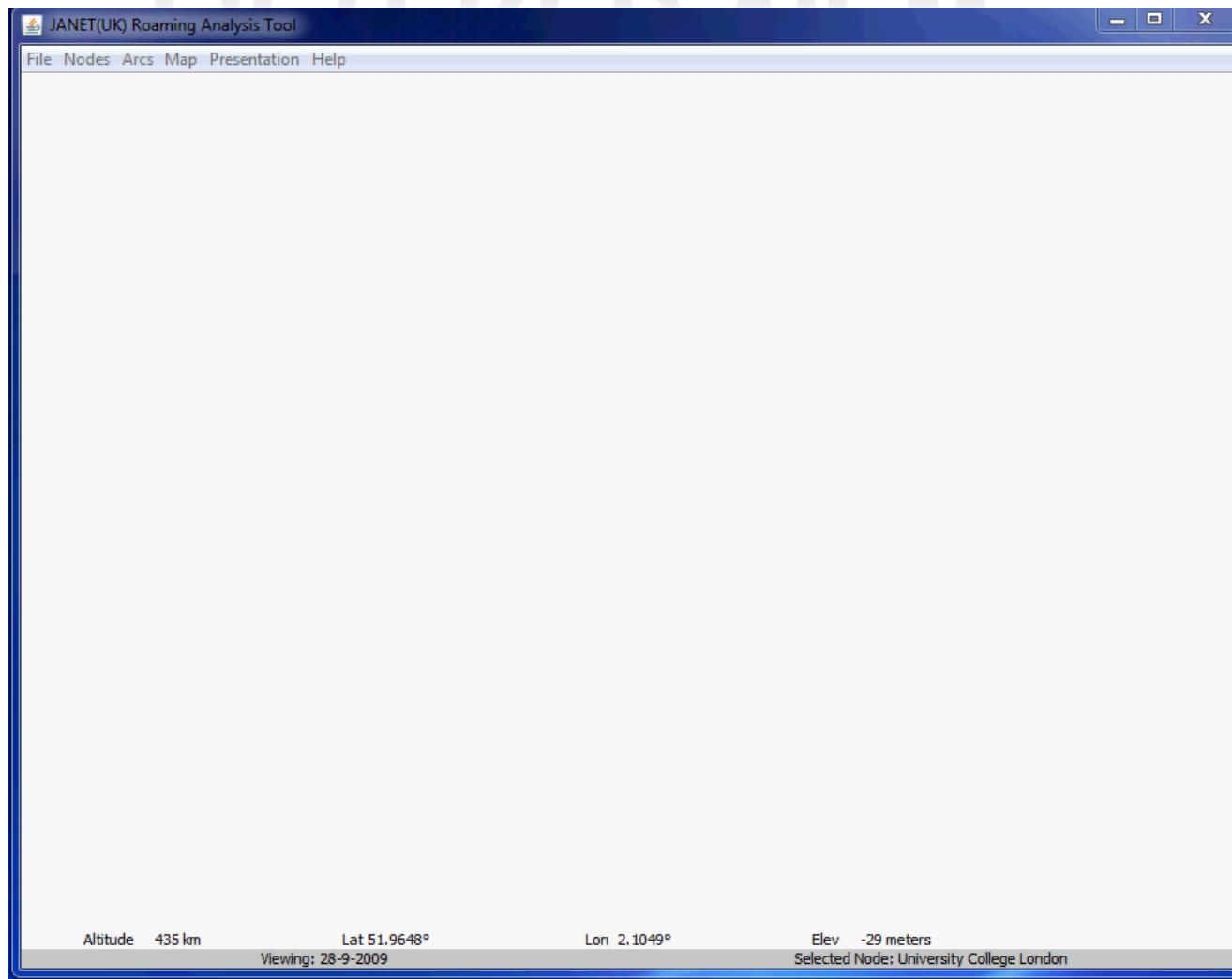
SEEING THE SITES

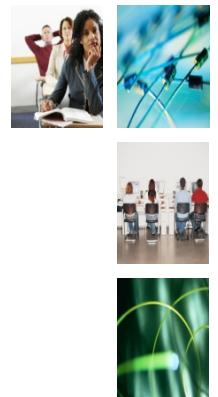


FLIGHT MAP

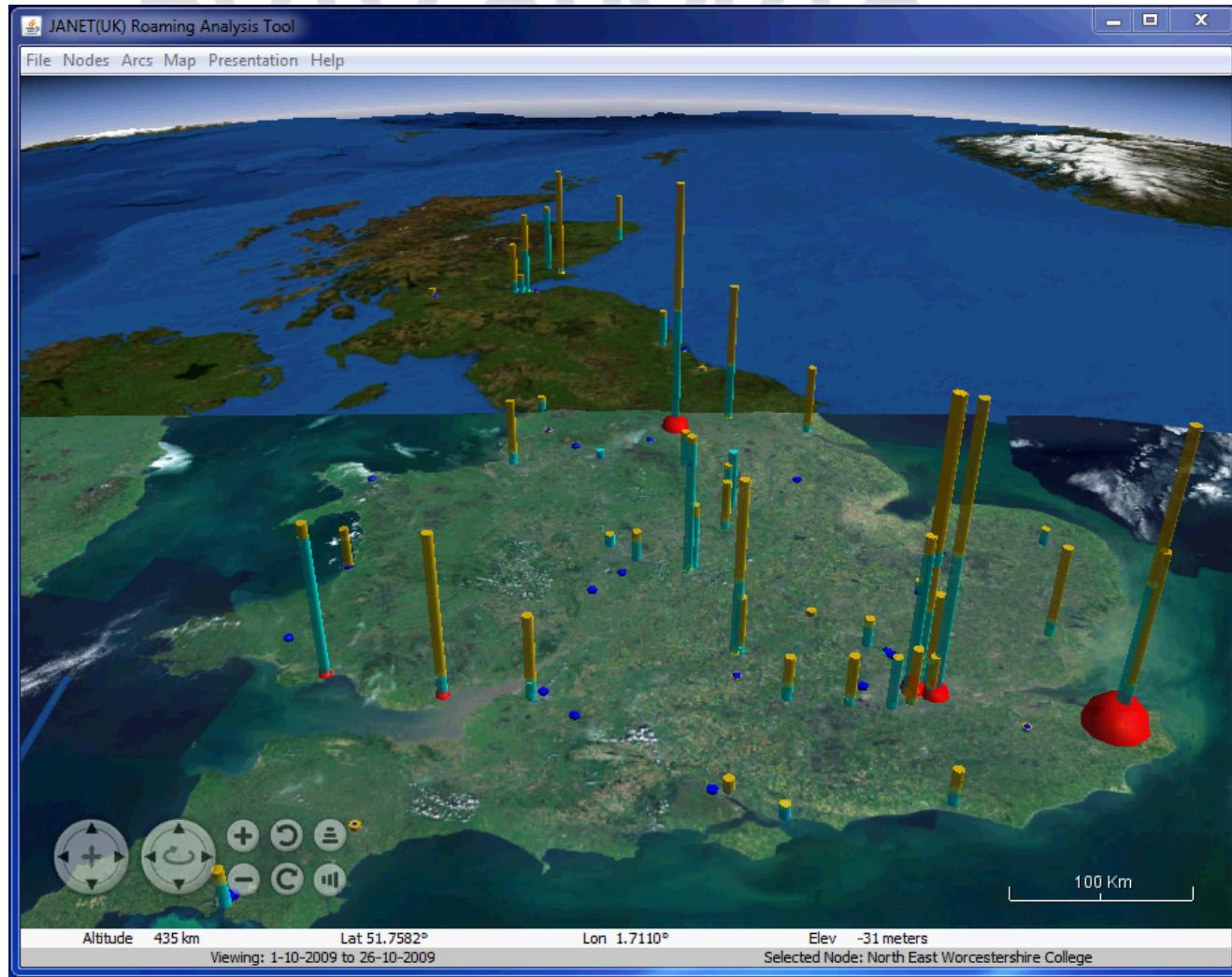


FILTERED VIEW

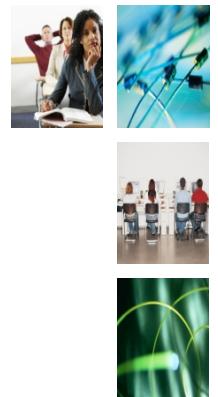
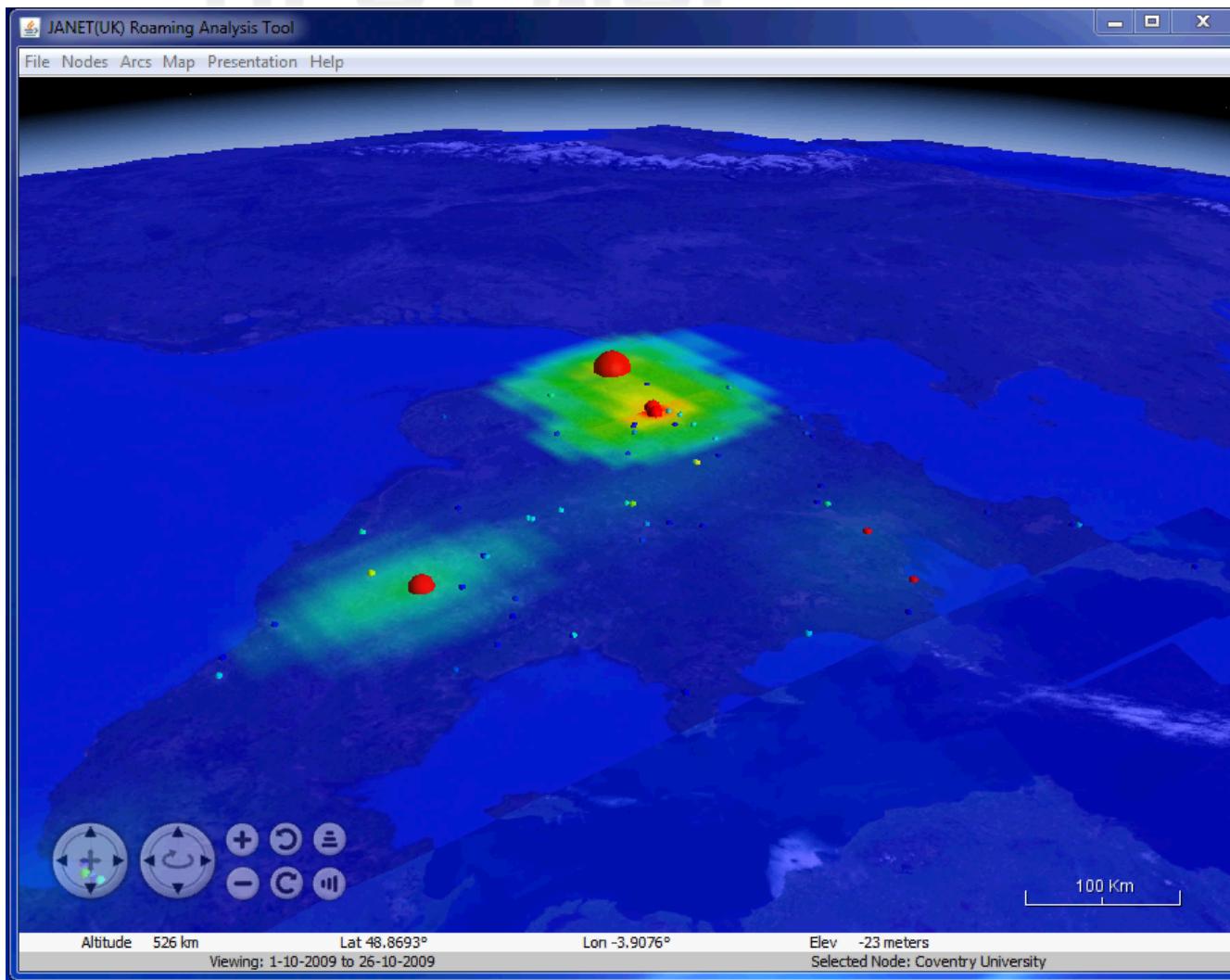




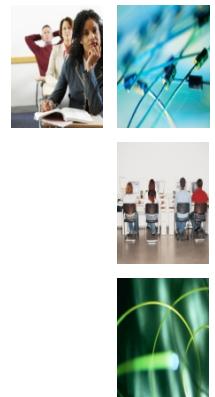
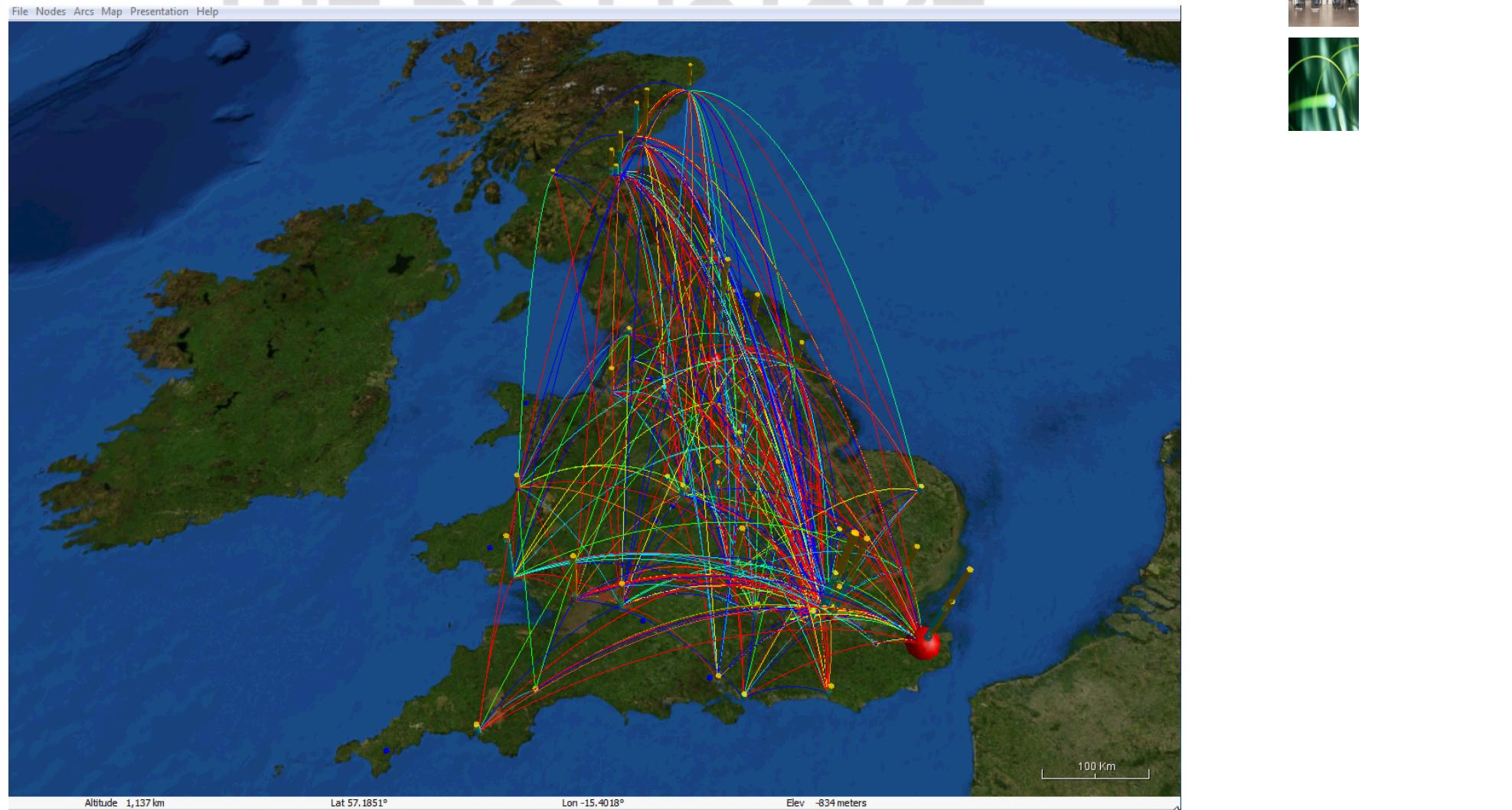
DATA CHARTS



HEAT MAP

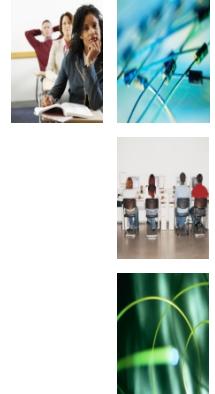


THE BIG PICTURE

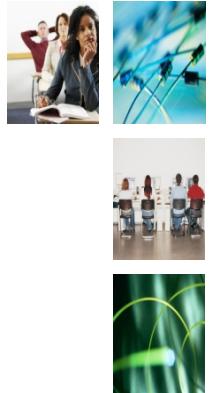


BUT...

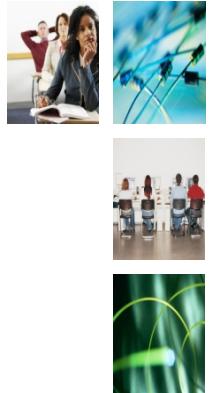
- Current eduroam design is based on binary peering, so the originator of requests to be proxied at the national level is always obvious.
- However, standard RADIUS ‘shared secret’ security is considered by some to be imperfect



SUDDENLY... RADSEC

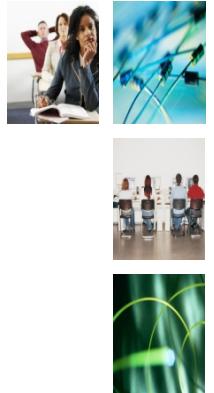


- “RADIUS over TCP/TLS” – advanced standardisation, split into multiple documents
- Secures the RADIUS packet exchange, *but removes any hints to the origin of the roaming transaction!*
- Monitoring and visualisation will be increasingly undermined as RadSec adoption increases



IF-MAP TO THE RESCUE

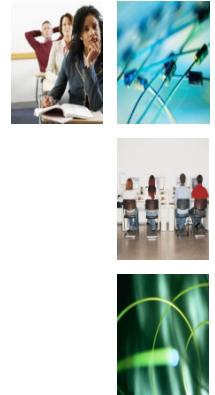
- MAP = Metadata Access Point
- Developed by the Trusted Computing Group (TCG), as part of the Trusted Network Connect (TNC) suite of standards



IF-MAP CHARACTERISTICS

- Standardises the kind of data gathering we currently use SNMP and Syslog for
- Aggregates and correlates data from disparate systems
- Allows arbitrary extensions to support new use cases without the limitations of a global schema
- Allows ‘subscription’: automatic notification of changes
- Simple to implement!

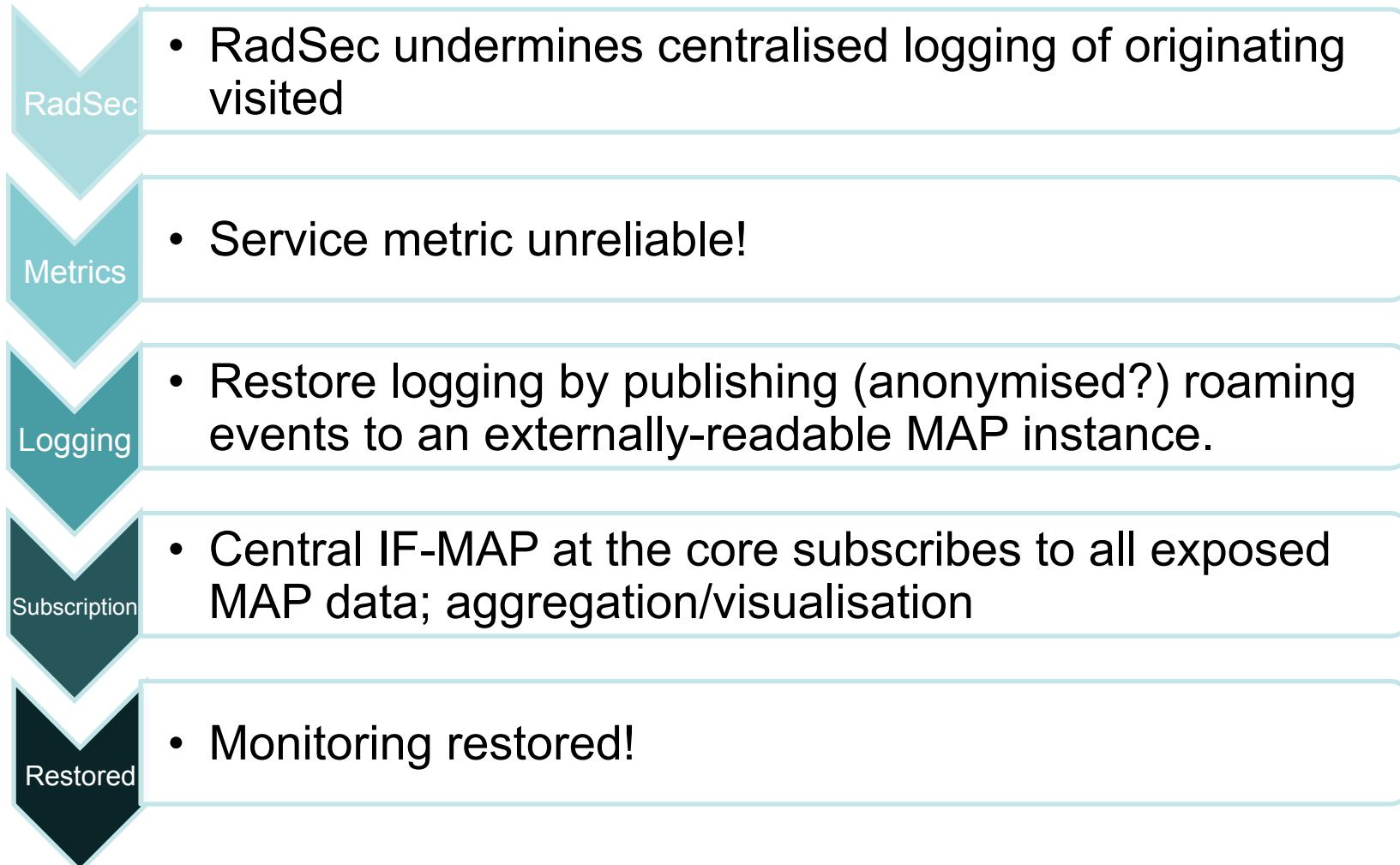
IN OR OUT?

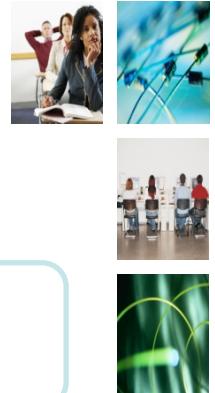


- IF-MAP was designed for use cases internal to the network domain
 - Primarily for 'next generation' NAC
- *What if we adapted it to allow inter-domain sharing of metadata?*

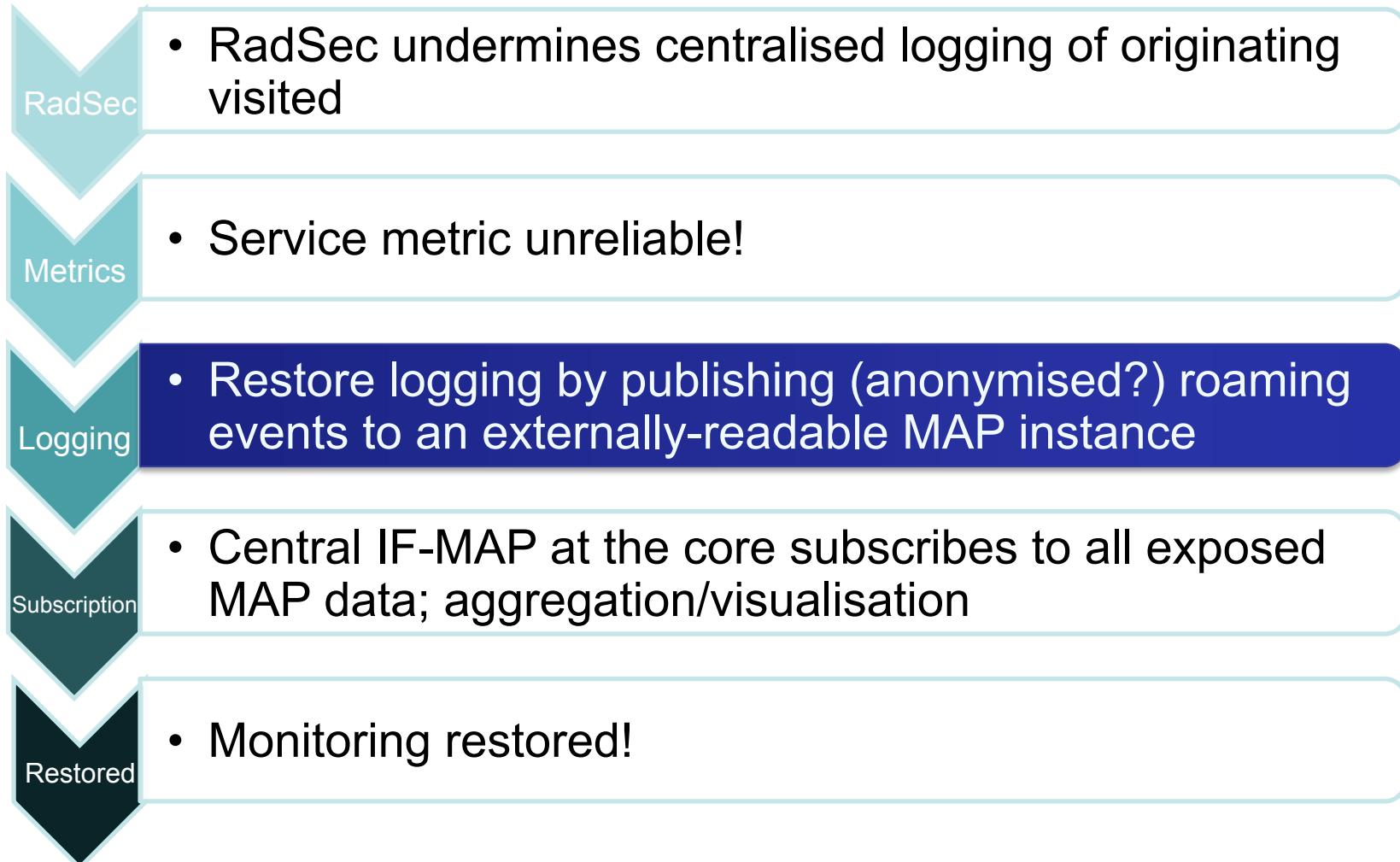


USE CASE: *EDUROAM*

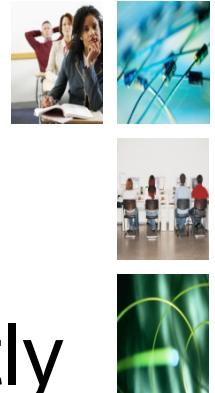




USE CASE: *EDUROAM*

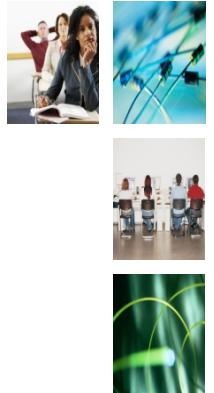


TWO TASKS



1. Enable RADIUS proxies to log directly to an IF-MAP instance
 - a) Directly modify one or more RADII?
 - b) PERL module or similar to allow arbitrary logs (and services) to be tailed into IF-MAP
2. Secure a MAP instance such that it may be exposed outside the organisation firewall
 - a) Authentication/Authorisation – Federation?
 - b) Improved server security model

TRIVIAL?

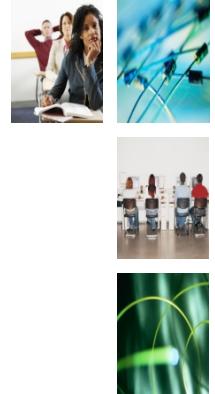


- “Tri via” – the meeting of three roads
- Traditional site for placement of community noticeboards ~100 A.D.

So, if we are doing this for eduroam...

- Does collecting a lot of ‘trivial’ local data give a more valuable emergent picture of larger scale features?

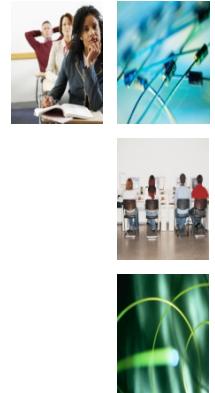
A POSSIBLE FUTURE?



- Many classes of metadata are of interest between community members
 - Domain ‘network weather’
 - Shared intelligence (IDS etc.)
- Some classes of metadata could usefully be aggregated at the JANET core
 - JRS/eduroam stats is just one example...

THANKS FOR LISTENING!

Are there any questions?



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