AMUSE: 21 & 22 Sept '06

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Outline

- Current Status
- Health Map & Discussion
  - Brief outline scenarios...
  - Visualisation of information
  - Structure of a nationwide SMC

Current Status

- Discovery, event and policy services all working together.
- We're now using the new Policy service.
- Codebase should be able to communicate via:
  - udp/ip, Bluetooth, Zigbee (Telegesis), Zigbee (BSN)
- Source code is under SVN control, and accessible at:
  - `https://nsmc.dcs.gla.ac.uk:8876/amuse/trunk/src/`

ZigBee (Telegesis) status

- Telegesis ZigBee cards are driven via the serial interface Telegesis provides.
- Via this interface, MTU is 51 bytes.
  - So ZigBee transport for these cards fragments and reassembles packets larger than 51 bytes.
- Telegesis cards seem to have a reasonable range (between 5 – 10 metres)

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Health Map

- The AMUSe case for support says the following:
  - *The second demonstrator will be used to build a "Health-map" service that is capable of collecting and analysing data from multiple sources: from patients (anonymously), from weather and environmental sources, from hospitals, from Ordnance Survey etc. At a superficial level the service can produce a Health-Map that summarises the health of the nation. At a more serious level its data can be provided to support e-Health data-mining and be used in emergency situations (e.g. the outbreak of an epidemic) to manage and adapt healthcare services and resources.*

Health Map: Scenario 1

- Consider the Bird Flu example we discussed previously. We want to be able to plot:
  - Where an incidence has occurred
  - When that incidence occurred
- This sort of scenario may require a quick response from the system, possibly as part of a larger alert system...
  - Could also store when the incident was *reported*, to help evaluate nationwide response at a later date.

Health Map: Scenario 2

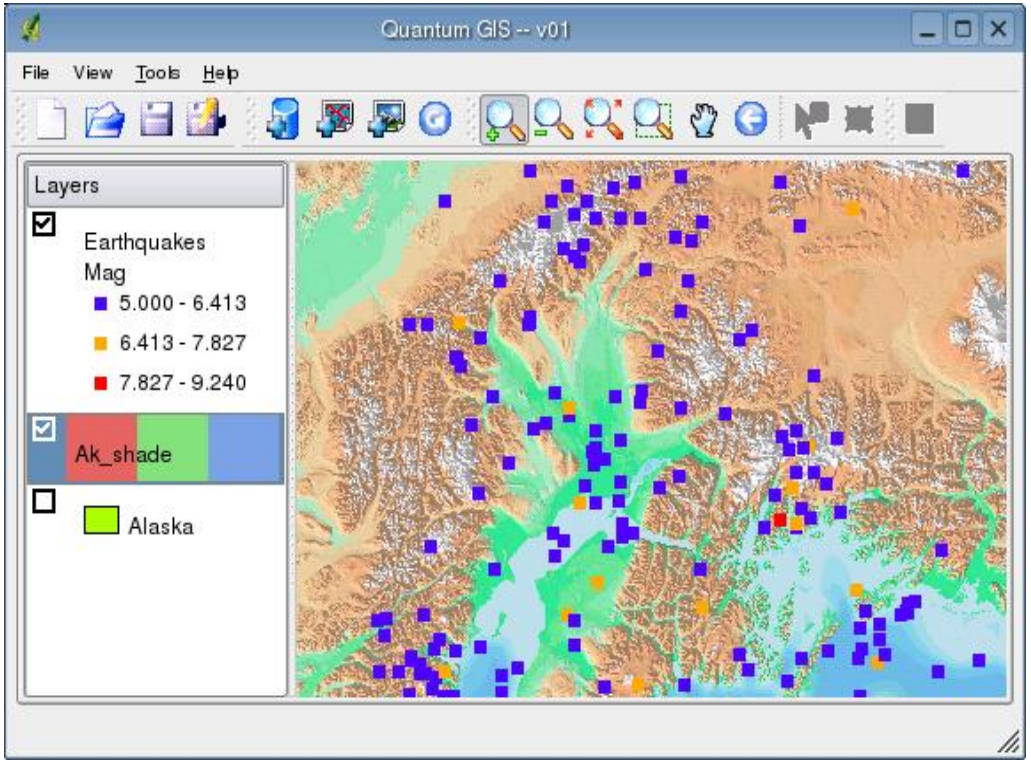
- A slightly less alarming example
  - Plot new instances of liver cirrhosis reported per month by county.
- Not a real-time system. Requires data to be stored in a known location.
- Storing of anonymous data.

Health Map: Visualisation (1)

- Scenario 1: Want data to be reported back in real-time:
  - "Show me incidents of X as they are reported"
  - Most likely would draw on stored data as well, for context.
- Scenario 2: Want to be able to perform queries over stored data and visualise the results:
  - "Show me incidents of X over a period of Y months"
- What sort of software is available for visualisation of geographical data? Fortunately, plenty...

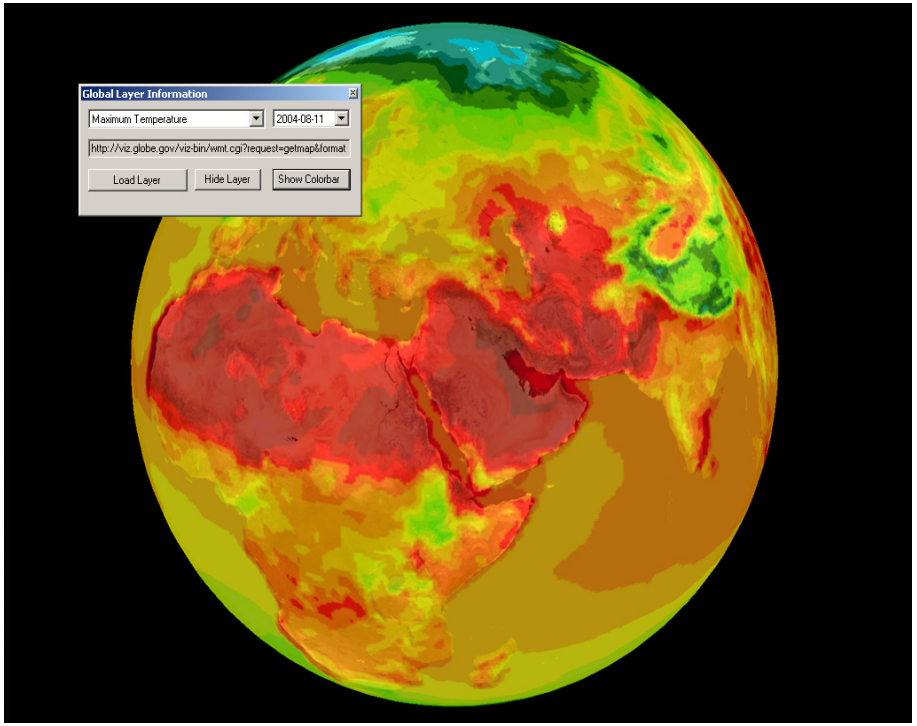
Health Map: Visualisation (2)

- PostGre, PostGIS & Quantum GIS
  - Relational database with Geographical Information System extensions.
  - Quantum GIS is one possible front-end:



Health Map: Visualisation (3)

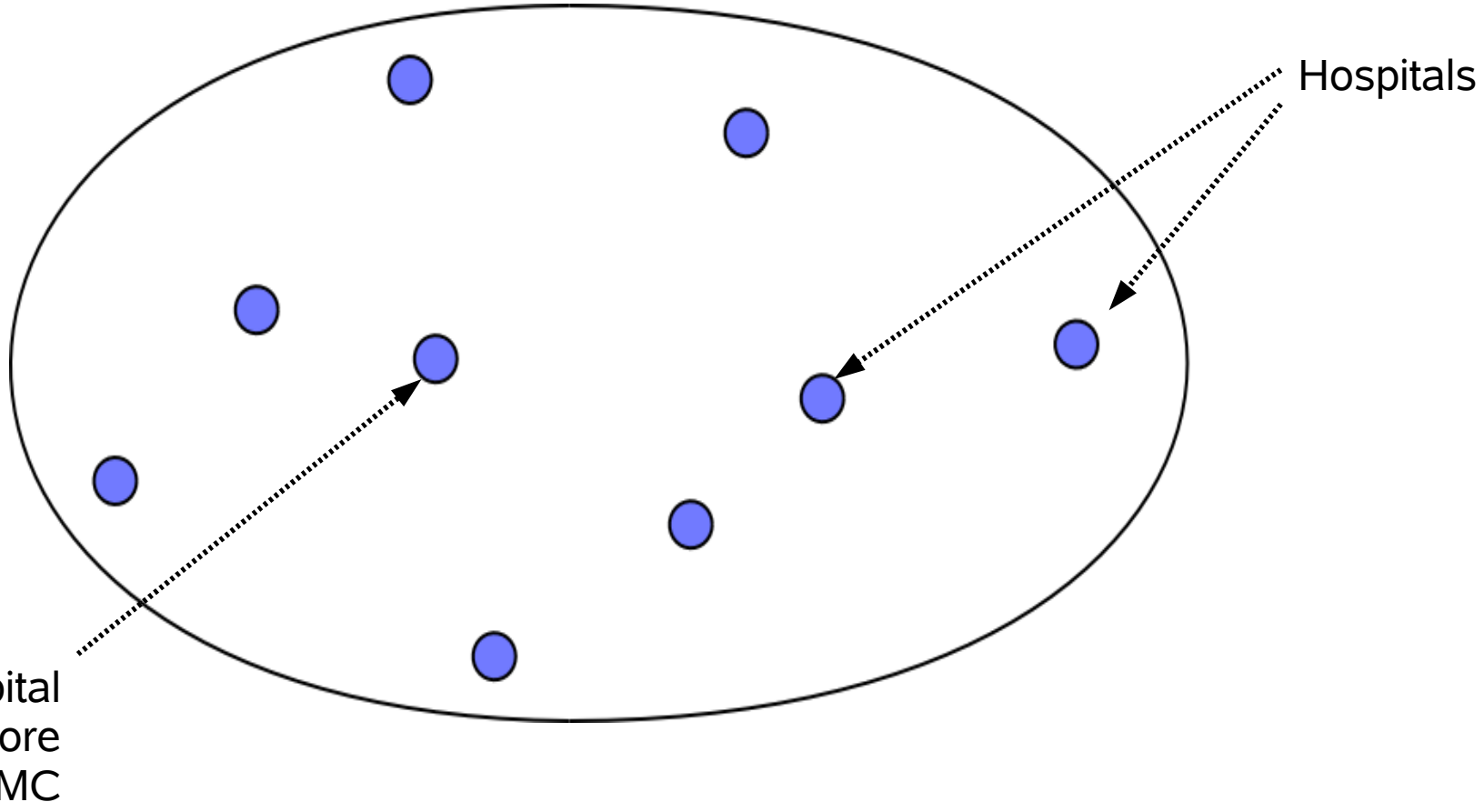
- Google Maps/Google Earth (cool-factor)
- Nasa World Wind:



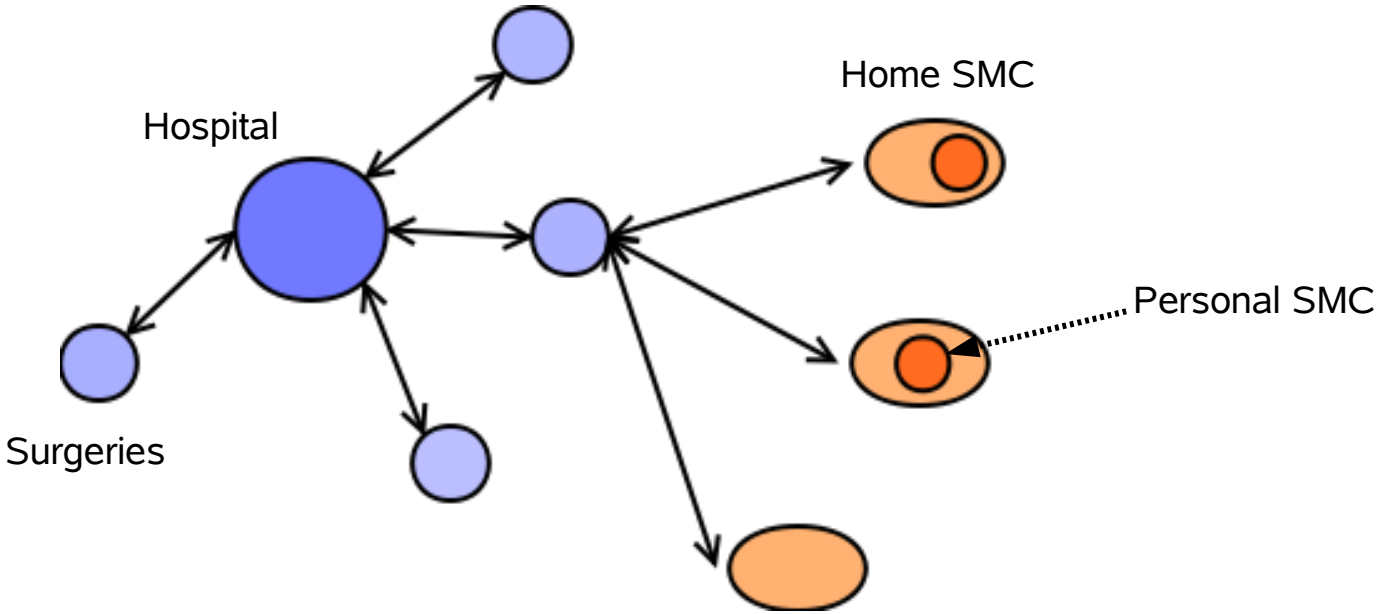
Health Map

- There are a few immediately obvious issues to address to create the Health Map:
  - How is a nationwide SMC structured?
  - Where is the collected data stored?
    - Key concerns are not only the privacy issues, but also what resources (network, storage) are available for the data at various locations
  - How can we visualise the data captured by components within that SMC?
  - How flexible can this visualisation system be?

Health Map: Structure (1)

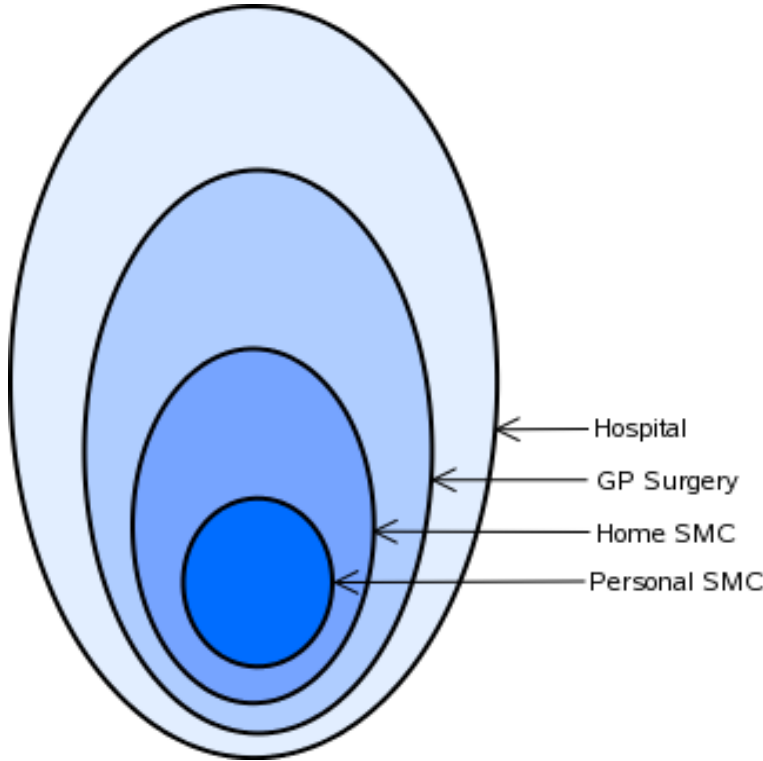


Health Map: Structure (2)



Health Map: Structure (3)

- If an SMC Core consists of three major components (discovery, policy, event bus), we must decide what these mean at a national level.
  - We've obviously taken care of the Personal SMC scenario.
  - What do the services mean at other levels?

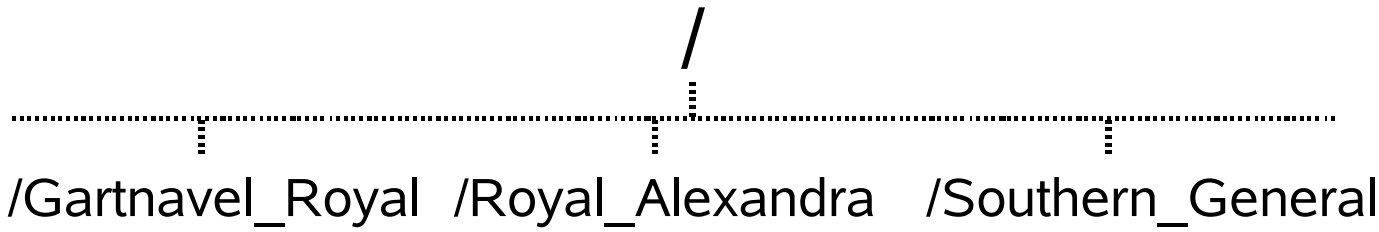


Health Map: Structure (4)

- Discovery service:
  - Home, GP and Hospital SMC would run discovery protocols locally to locate the personal SMCs of any staff or patients.
  - However, it makes little sense for a hospital to attempt to locate other hospitals...
    - i.e., discovery at these levels is used to discover child nodes, not peers.

Health Map: Structure (5)

- Policy Service: Naturally maps to whatever hierarchy we choose:



- Event Bus: At these scales, Siena makes much more sense, and seems a natural solution.

Health Map: Structure (6)

- How do we get data from the patient to the visualisation system?
- Possibly propose two new services for a nationwide SMC:
  - One for data management, running at the SMC Core (in a sense, the health map back-end)
    - Policies/missions determine where data is kept, and how frequently it is moved around
  - Another for visualisation (the health map front-end)
    - Utilising the data gathered by the data management service and/or influencing what data it manages...

Health Map: Structure (7)

- Data management service should be able to inform hospitals what data to store, and possibly where to store it.
  - When to move data around may entirely be part of the relationship between any two SMCs (missions), or could also be modified by this service. For example, a home SMC might transfer non-critical patient data to the GP's surgery at a pre-arranged time in the evening.
  - I expect that this service would go some way to offering the functionality we need for the Bird Flu example...

Health Map: Structure (8)

- The Visualisation service should potentially be run from many hospital, GP surgeries, libraries, etc
  - Obviously authorisation policies a-plenty here…
- It should be able to query the dataset.
  - What information do we want to display?
    - What information are we *allowed* to display?
  - What time frame are we considering for the data?

Health Map

- So, in order to proceed with the health map:
  - What data do we have available to us? Where can we get it/how can we generate it?
  - What do we *really* want to demonstrate here?
    - Do we want to demonstrate the health map? The nationwide SMC? Given the latter, how large a simulation/testbed?

Hmm...