AMUSe: 10 & 11 May '07

Stephen Strowes
University of Glasgow

Outline

- Wider-area SMC
  - Core services
- Discussed scenario & simulation
  - Characters, data transfer, data storage
  - Brief simulation description
- Visualisation
  - Using stored data

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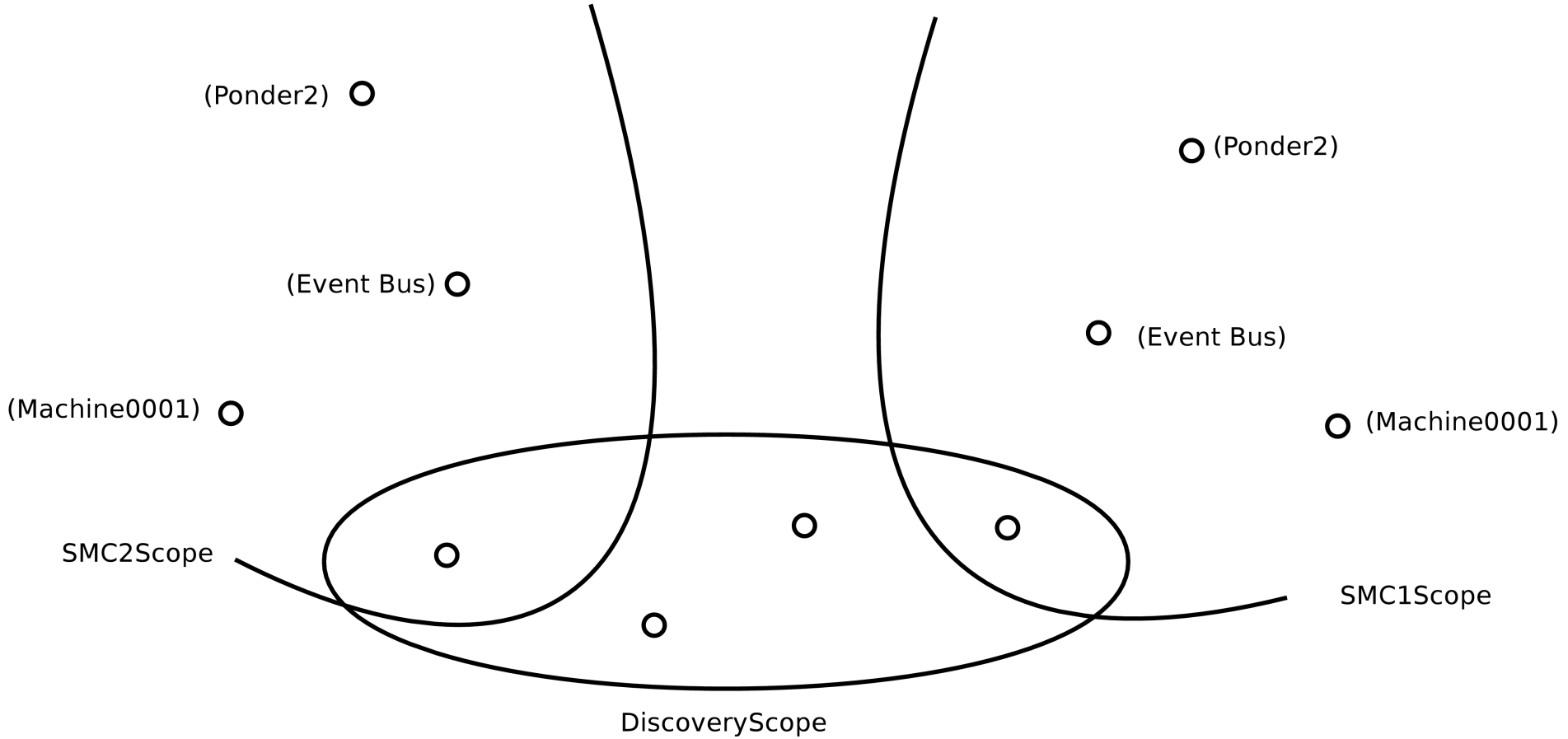
Wider-area SMC: Discovery

- Service-Location Protocol (SLP)
  - Defines user, service, and directory agents
  - In essence, replaces our broadcast mechanism
    - Operates naturally within subnets, though DAs in different subnets can be attached to cross this boundary
  - SLP defines *scopes*, within which advertisements exist (either for a given time, or indefinitely)
    - Each SMC is a member of two scopes:
      - DiscoveryScope
      - (SMC Name)...

Wider-area SMC: Discovery



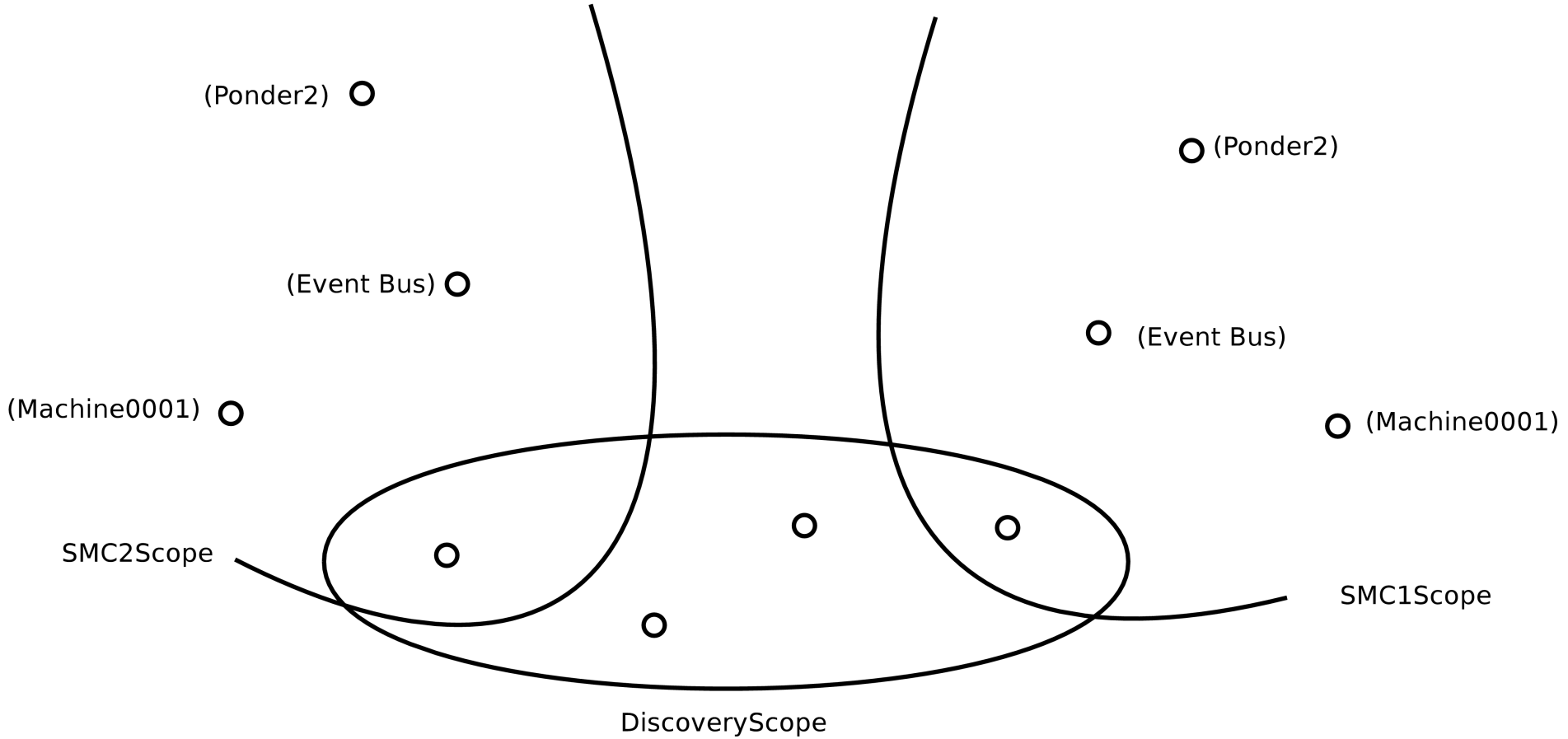
Wider-area SMC: Event Bus

- Siena
  - Closely related to the small event bus built for PDAs
  - Designed to scale to larger systems naturally

Wider-area SMC: Policy

- Ponder2
  - Handles managed object representations of the discovery service and event bus
    - Configured via boot.xml, or XML commands
  - Using Alberto's implementation to pair SMCs in a P2P fashion after discovery

Wider-area SMC



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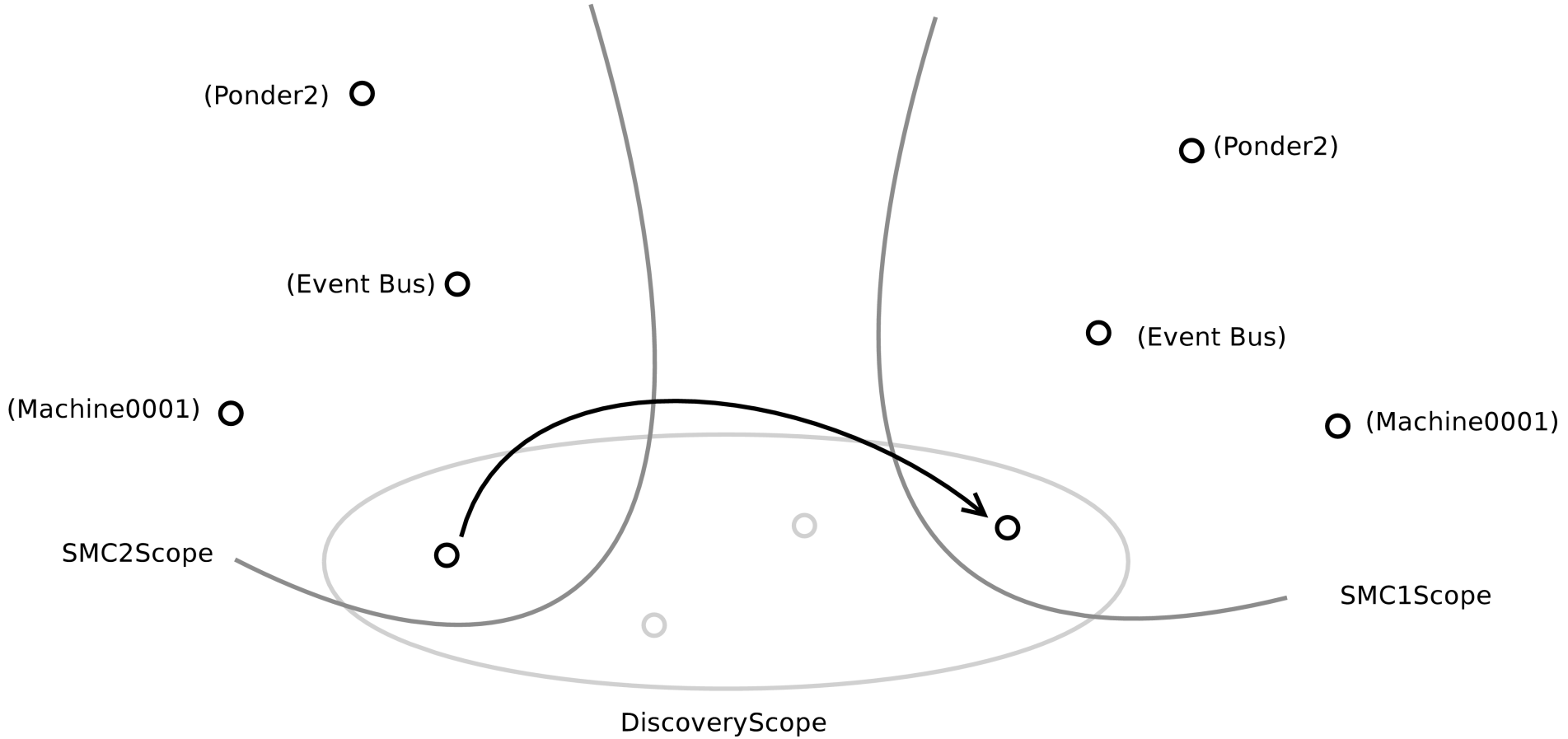
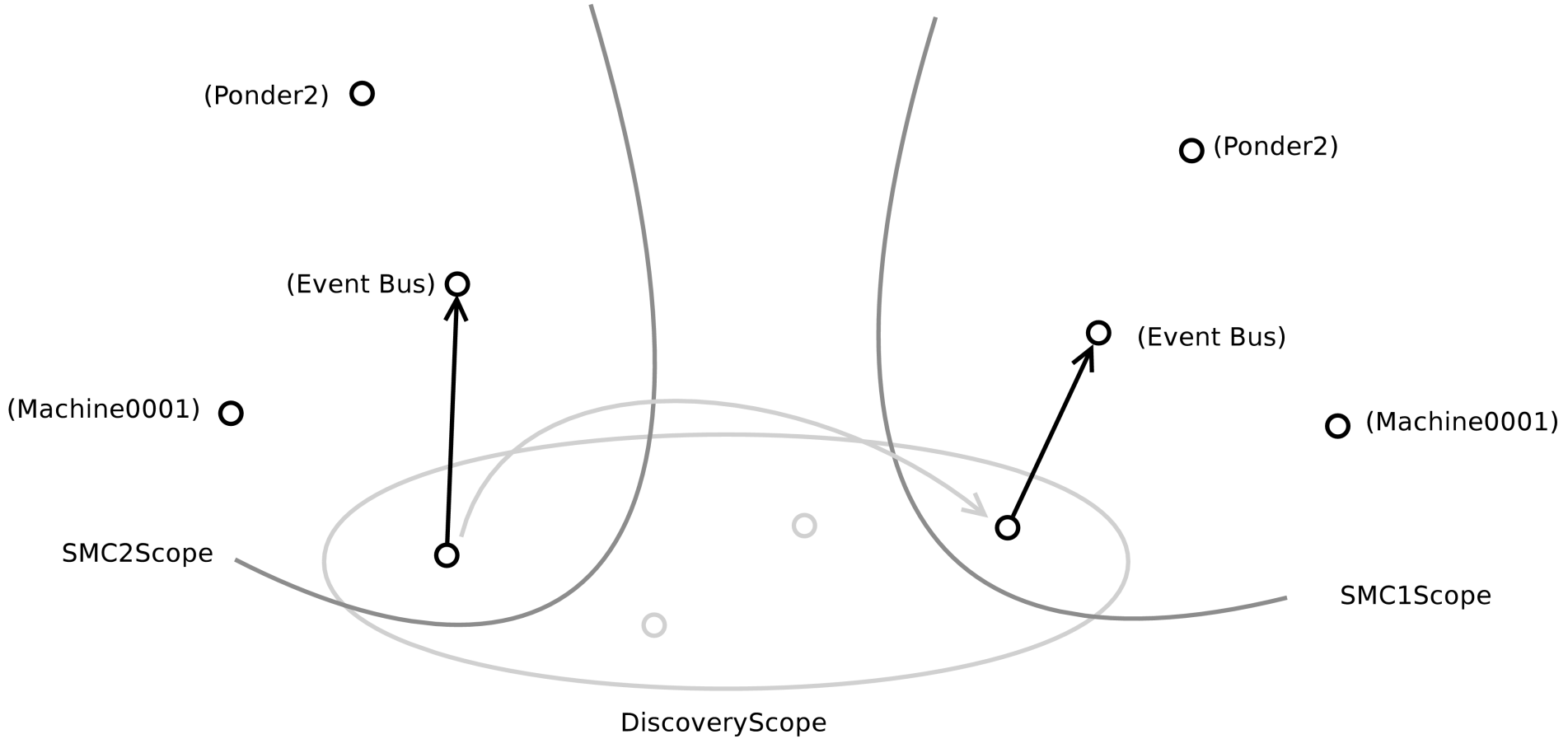


Wider-area SMC



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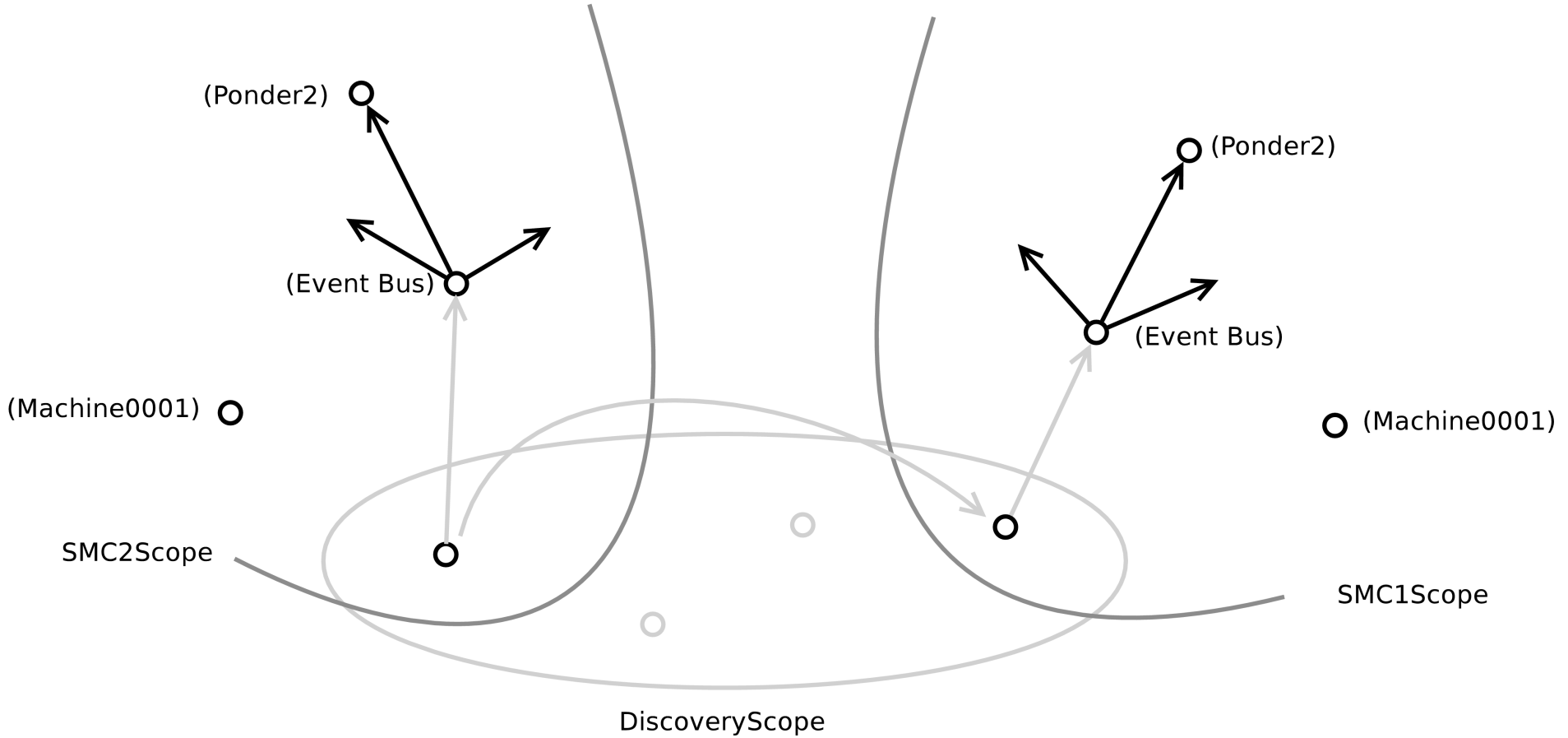
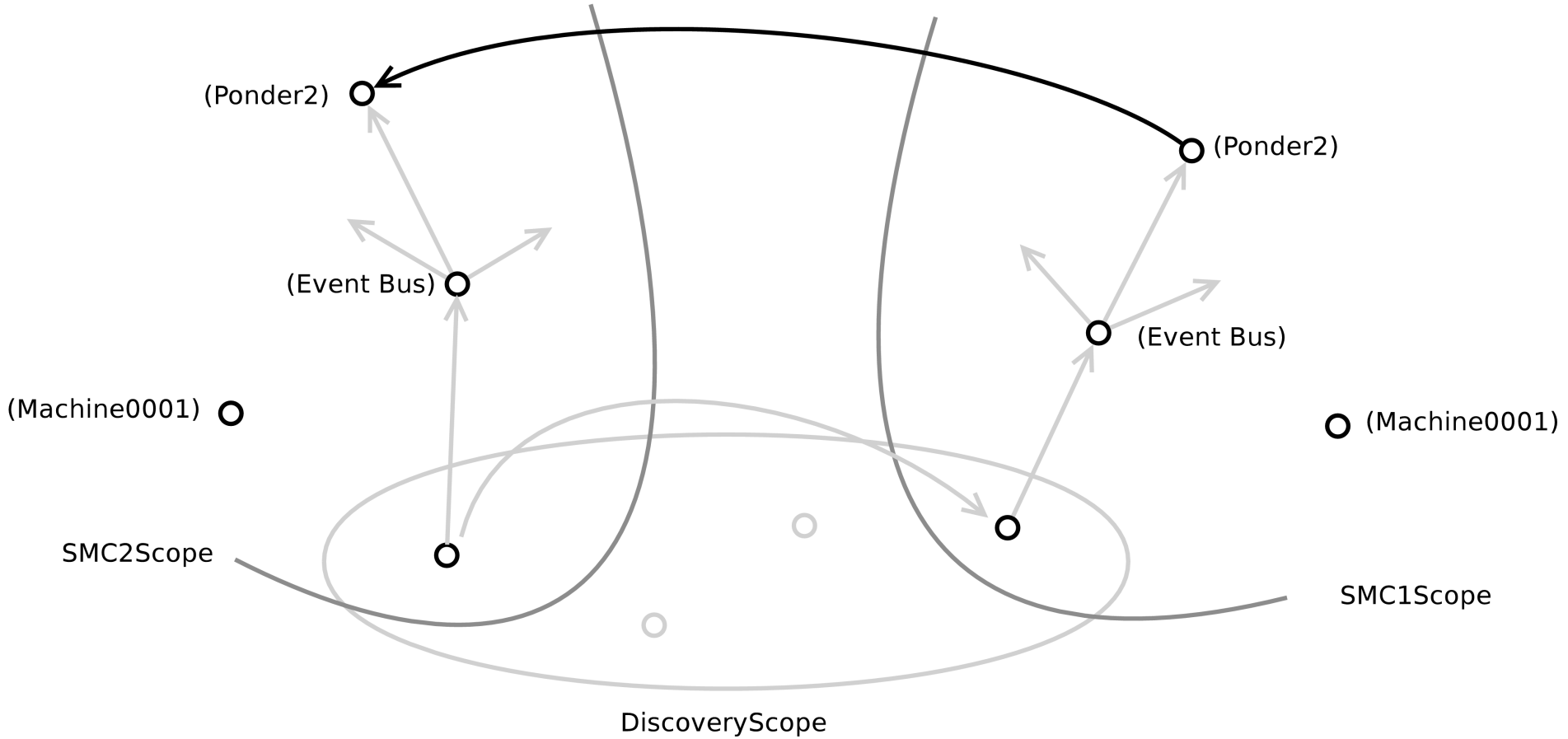


Wider-area SMC



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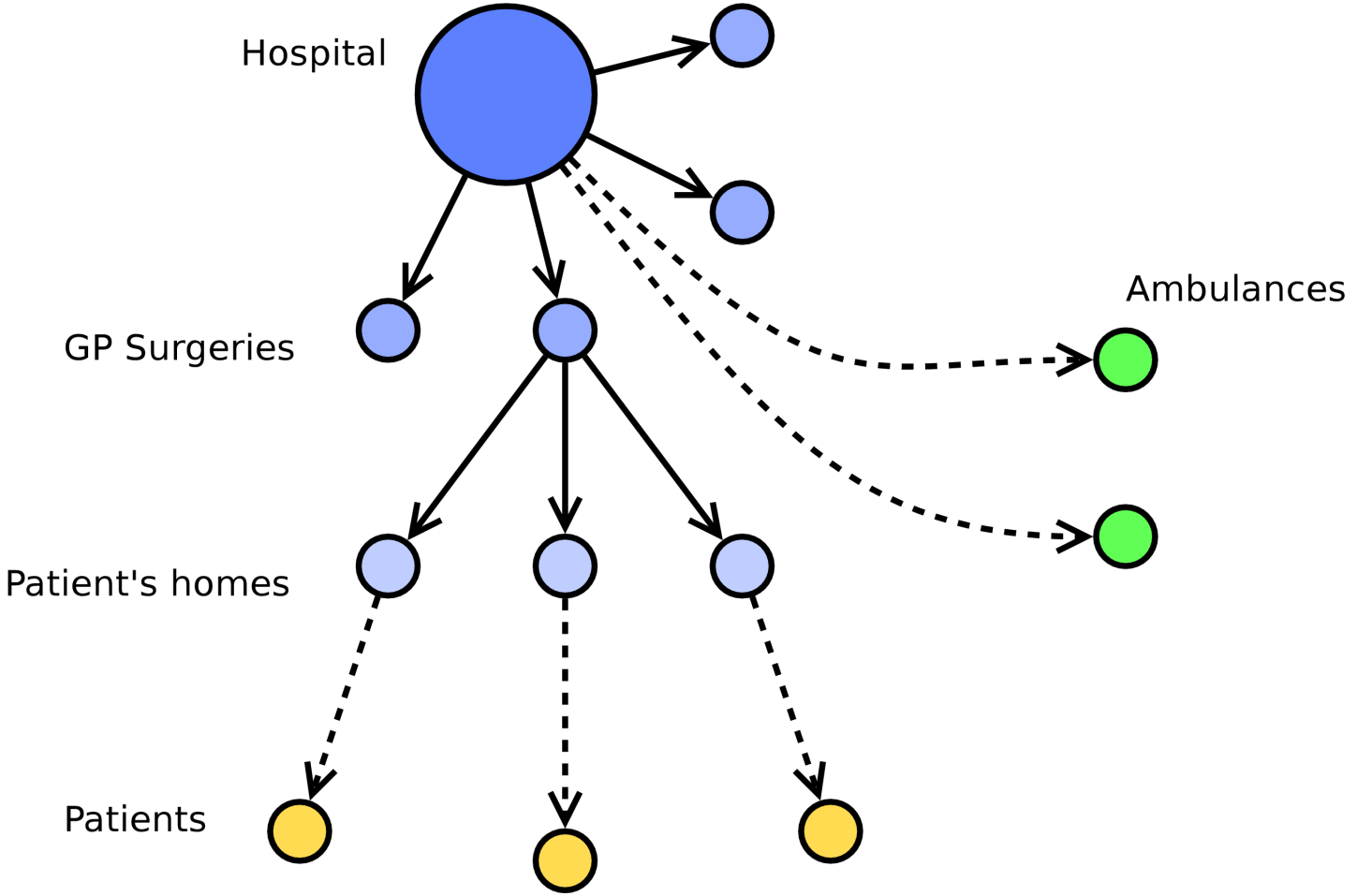
Scenario

- Patient's asthma inhaler *is* the patient's SMC
- Inhaler configured to relay data back to data store at GP Surgery frequently
  - e.g., once every week, for 1 year
  - Inhaler obviously must be configured on a per-patient basis, so we may assume specifics such as the name or ID of the GP Surgery are pushed to the patient's SMC prior to monitoring

Scenario

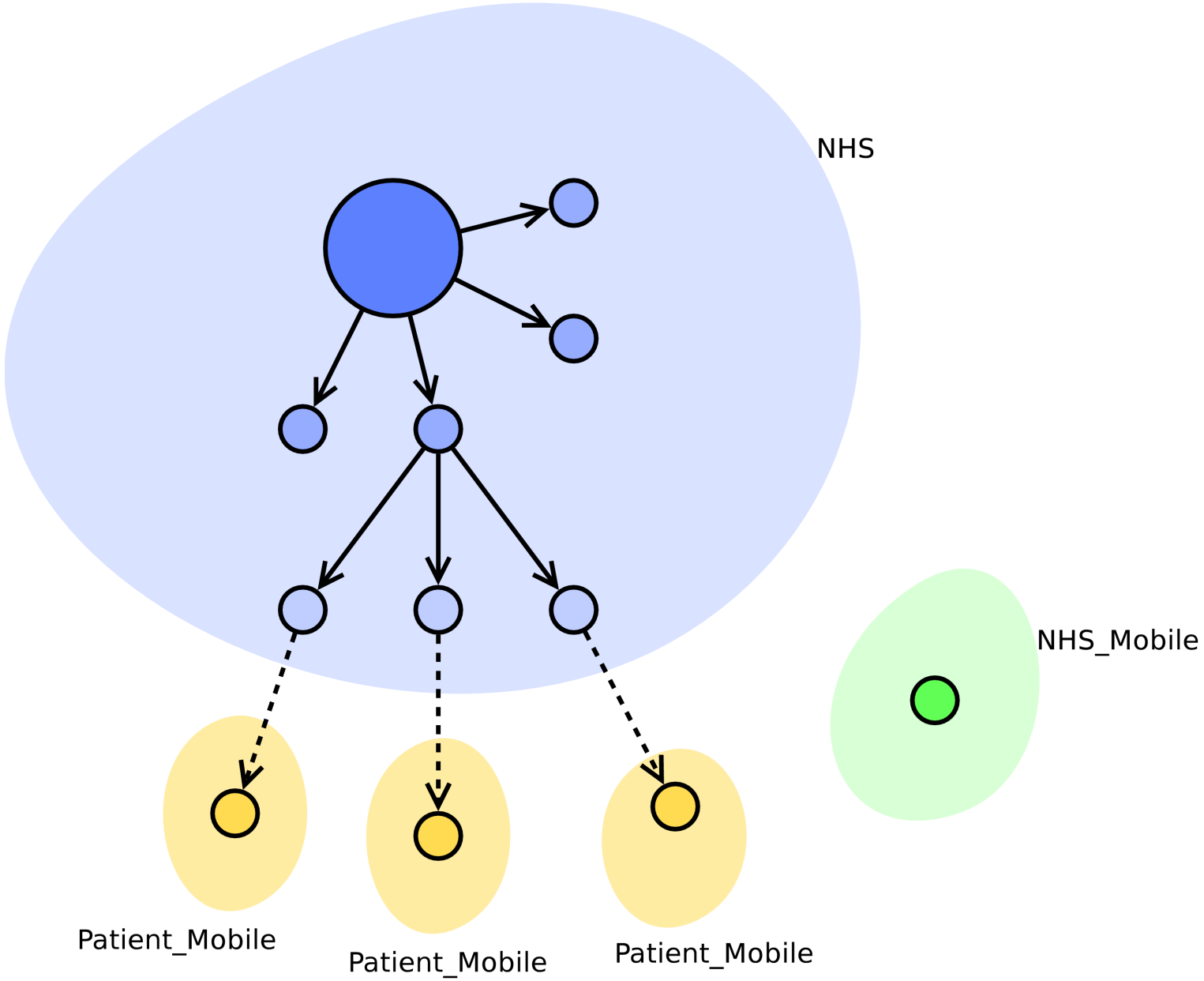
- Characters:



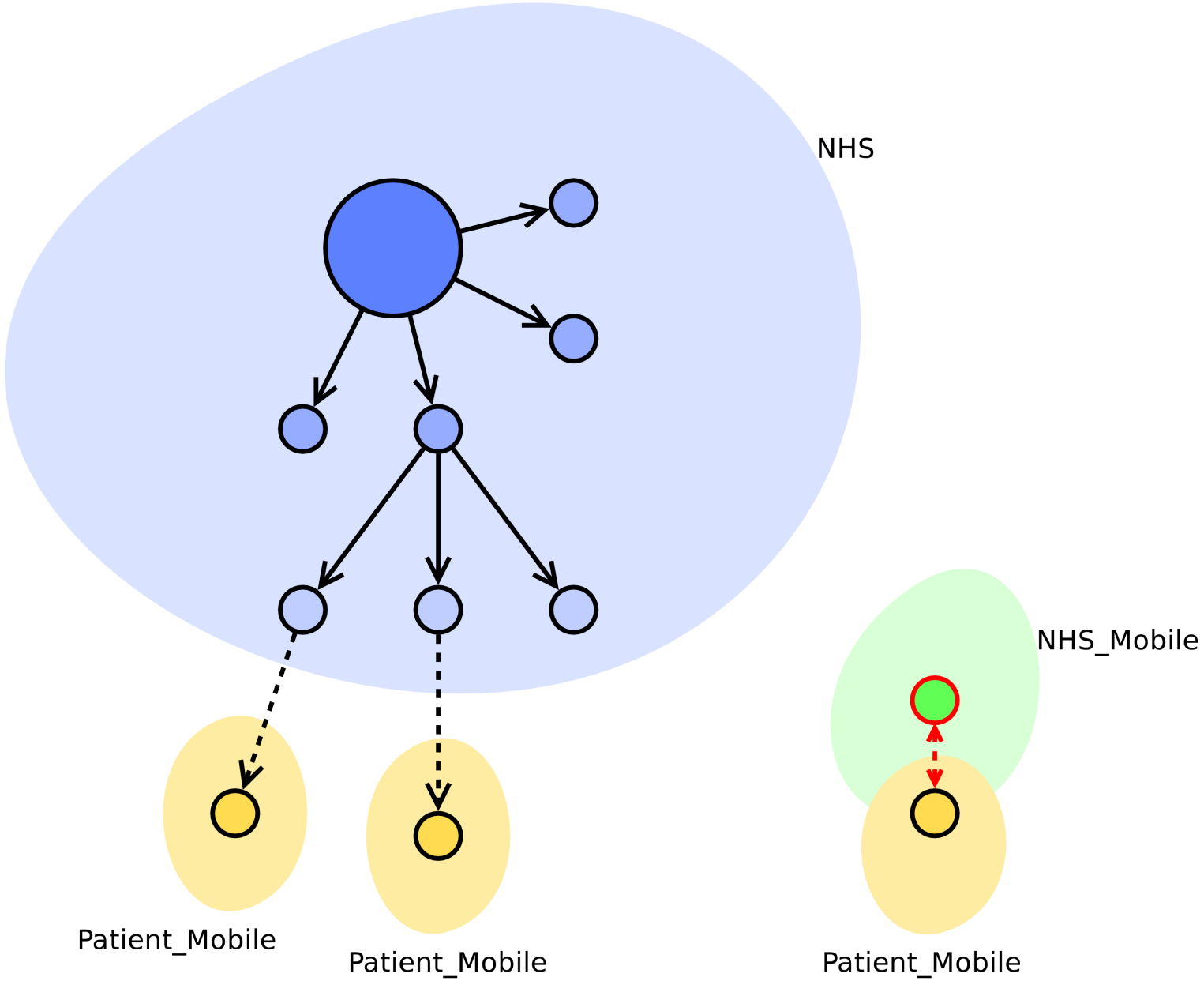
Scenario

- Data transfer (delay tolerant networking):
  - Cannot assume the following:
    - patient or NHS will absorb the cost of providing more than one communication mechanism to patient
    - patient or NHS will absorb the cost of using wide-area networks (e.g., GPRS, UMTS)
    - wide-area networks will always be available
    - device restrictions (space, battery power, robustness, ease of transport) would allow more than the most basic of hardware
  - Allows for inter-SMC data transfer which applications may use (not a requirement!)

Scenario


NHS
NHS_Mobile
Patient_Mobile
Patient_Mobile
Patient_Mobile

Scenario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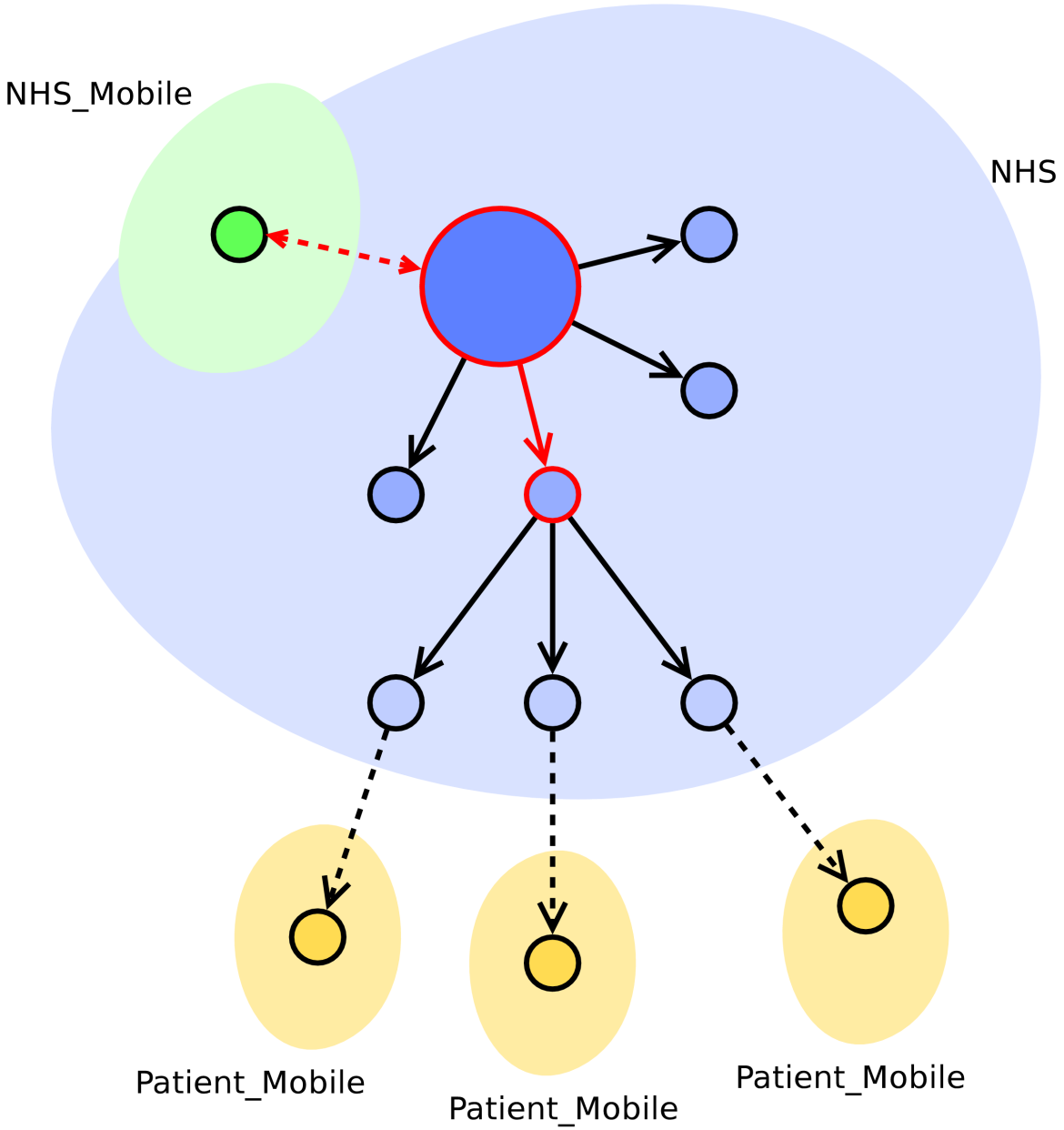
Scenario


NHS_Mobile
NHS
Patient_Mobile
Patient_Mobile
Patient_Mobile

Simulation

- Using the core services with DTN functionality, I aim to simulate a network similar to that described in previous slides
  - Size of network (example)
    - 4 hospitals
    - 1 ambulance
    - 12 GP surgeries
    - 24 patient's homes & 24 patients

Simulation

- Data within system:
  - From Patient -> Stored at GP
    - patient ID; timestamp; usage count
  - From GP -> Used by Visualisation system
    - postal region; timeframe/date; usage count for area

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Visualisation

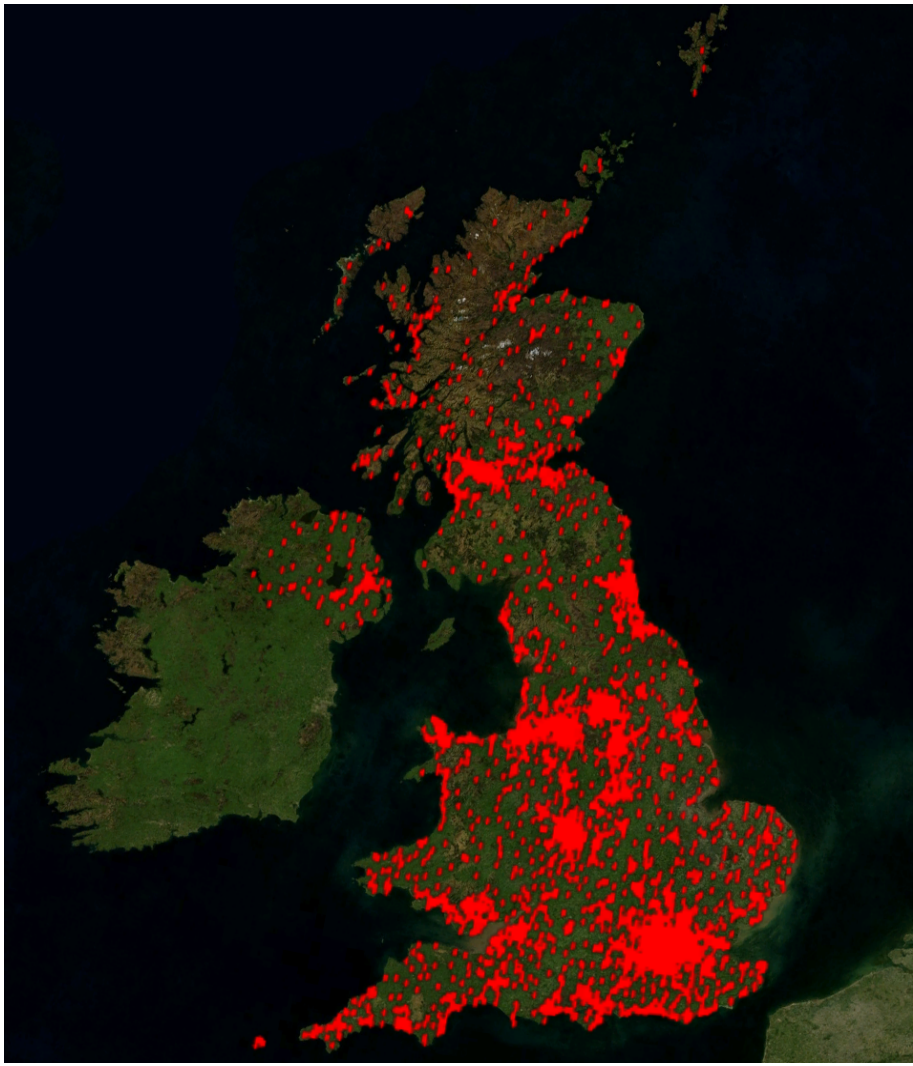
- Problem: information retrieval
  - We suggest storing patient data at GP surgeries
- There are over 150 GP surgeries in Glasgow; thousands across UK...
  - Industrial strength databases would have no problem with a few hundred nodes
  - Each GP has a unique ID, and data tagged with an ID is stored within this distributed DB only at that GP surgery...

Visualisation

- But are we describing a system that requires surgeries to be coupled together so tightly?
  - In our favour, we're creating geographically located data
    - GP surgeries operate within postal code regions
    - Queries will likely exhibit some geographic locality
  - Such a system could utilise two tiers of DBs:
    - first lookup postal code(s), get DB info for relevant surgeries
    - second, use this info to query each DB, collate & cache results

Visualisation

- Once we have the data, it's dirt simple to build basic overlays for visualisation tools such as NASA's World Wind
  - More complex overlays aren't even that difficult
- (World Wind currently opening up a Java SDK...)



Time...

- (Three weeks remaining)
- Plan is to conduct the simulation
  - Also, delve deeper into data retrieval once data is collected
  - Further consider how this data can be visualised

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Questions?
Discussion?