

# A Next Generation Cloud-based Health Care Platform – Towards Trust and an Infinite Possibilities



Nurse Kate

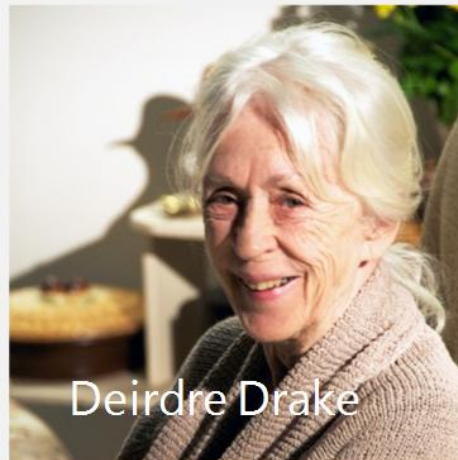
- Healthcare Professional.
- Invited user

Napier: Bill Buchanan, Christoph Thuemmler, Lu Fan, Elias Ekonomou, Owen Lo.  
Imperial: Prof Derek Bell



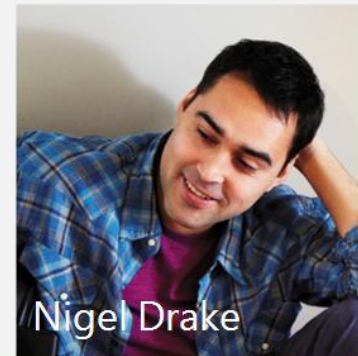
Sam Drake

- Site Creator
- Primary Carer



Deirdre Drake

- Care Subject
- 82 years old
- House bound
- COPD (Chronic Obstructive Pulmonary Disease)



Nigel Drake

- Invited user



# DACAR e-Health Platform

Trusted Services 

Chelsea and Westminster Hospital   
NHS Foundation Trust

Edinburgh Napier   
UNIVERSITY

**kodit**

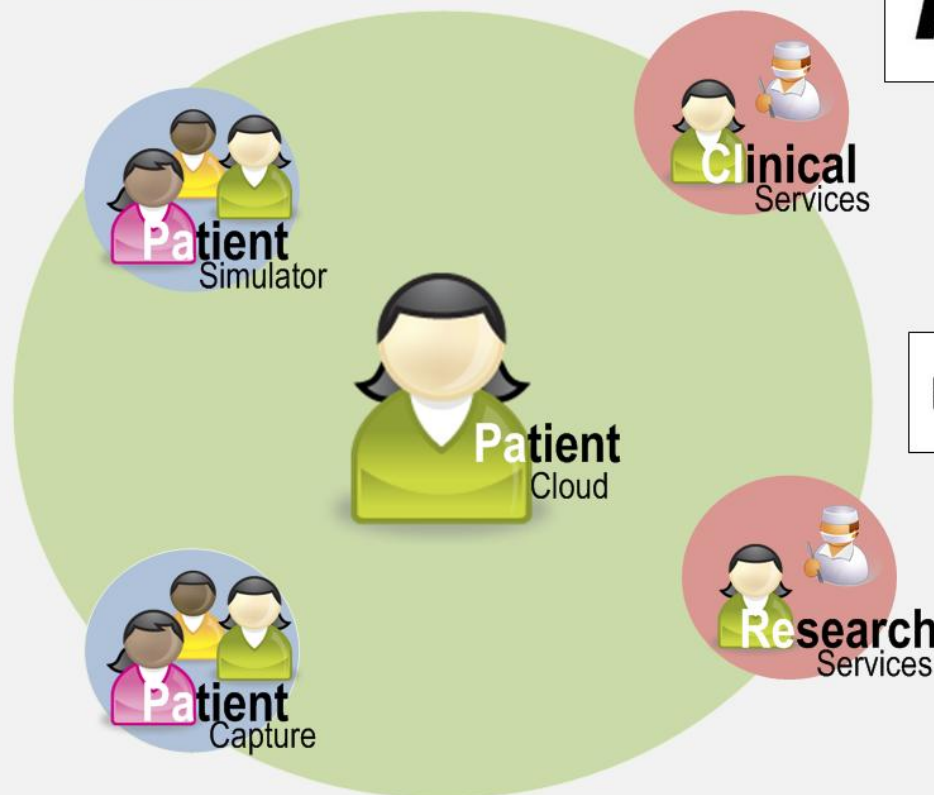
Imperial College  
London

**CIPHER LAB**



**Technology Strategy Board**  
Driving Innovation

**EPSRC**  
Pioneering research  
and skills



**Microsoft**

**HöIP**

Edinburgh Napier   
UNIVERSITY

# Societal

# Technical

Lack of integration between assisted living, primary and secondary care

Patient records are often static

Aging population

Different systems/formatting used for data

Lack of information sharing across the public sector

Limited/difficult access methods ... typically Government infrastructures ... lack of trust

Strong demand to consume health care data

Poor access control to data

Lack of integration with careers and trusted people

Data often aggregated and context is often lost



**Digital  
Trust**



Translation of rights  
Translation of identities

**Strong Governance  
Policy**



**Assisted Living  
(Informal and Trust  
based)**

**Primary Health Care (Formal  
and role-oriented)**

**Secondary Health Care  
(Formal and role-oriented)**

**Manager might ask:** What's difference in length-of-stay between different age categories for June?

**Consultant might ask:** How does the Early Warning Score affect the length-of-stay?

**Family friend might ask:** In which ward is Deirdre?

PatientID



Static  
Patient  
Record

- Often localised
- Different systems/formats
- Poor access control
- Poor identity verification
- Cannot be aggregated
- Etc.



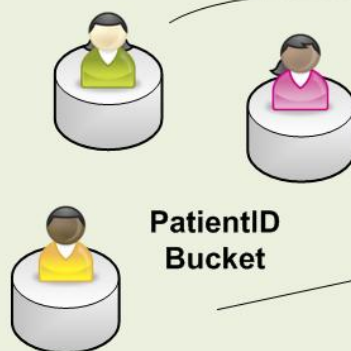
Clinical  
Services



ConsumerID  
(RoleID)

Domain A

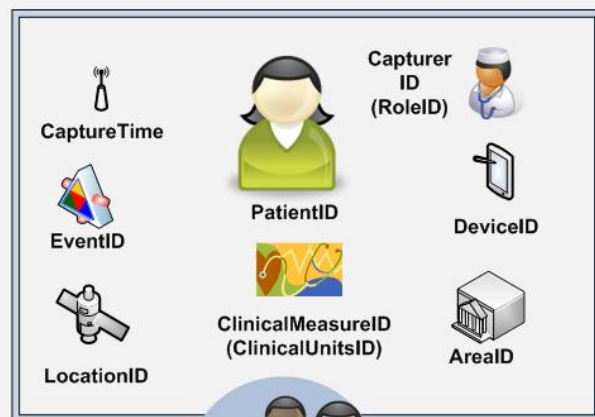
Data Storage  
(within the Cloud  
in buckets)



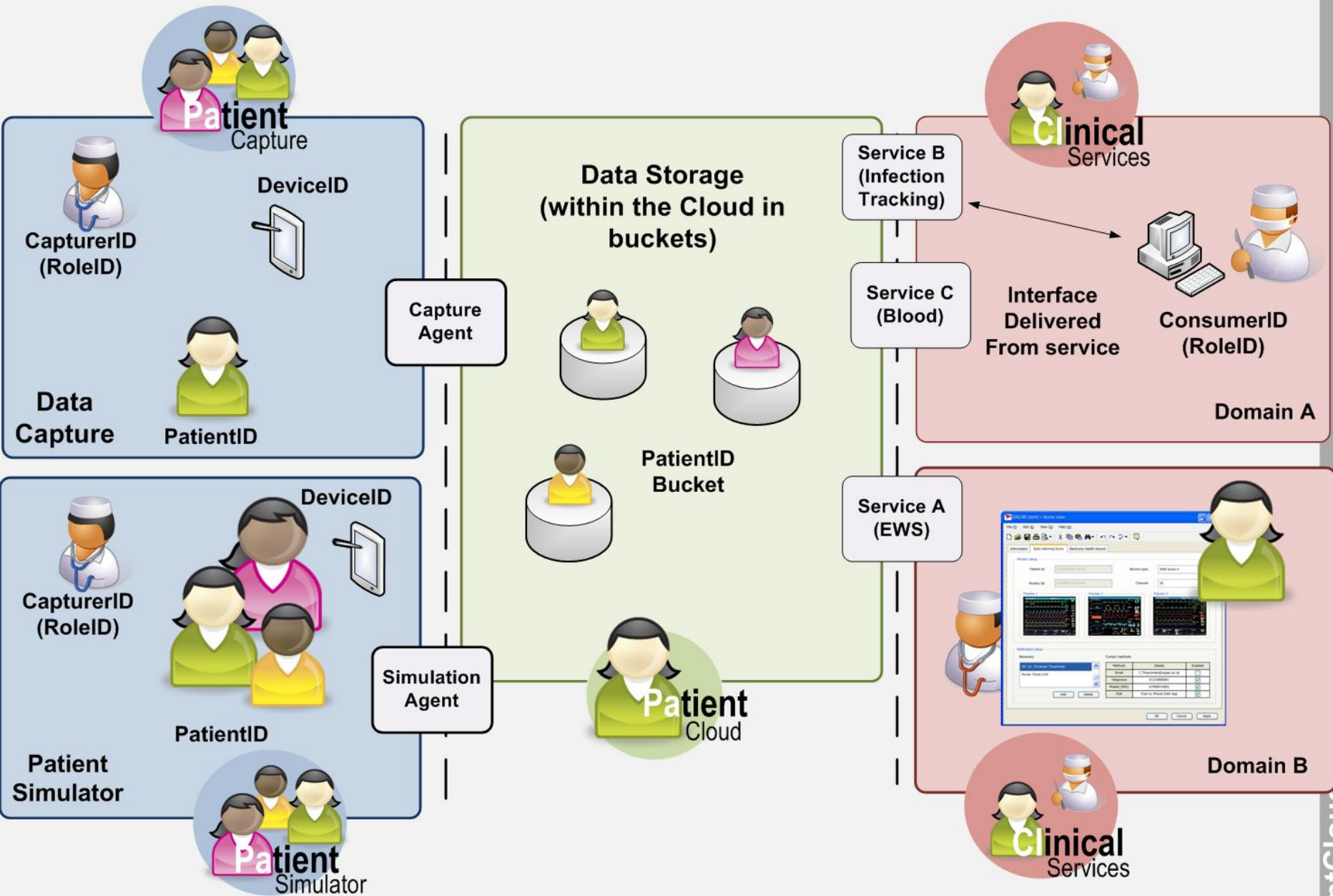
PatientID  
Bucket

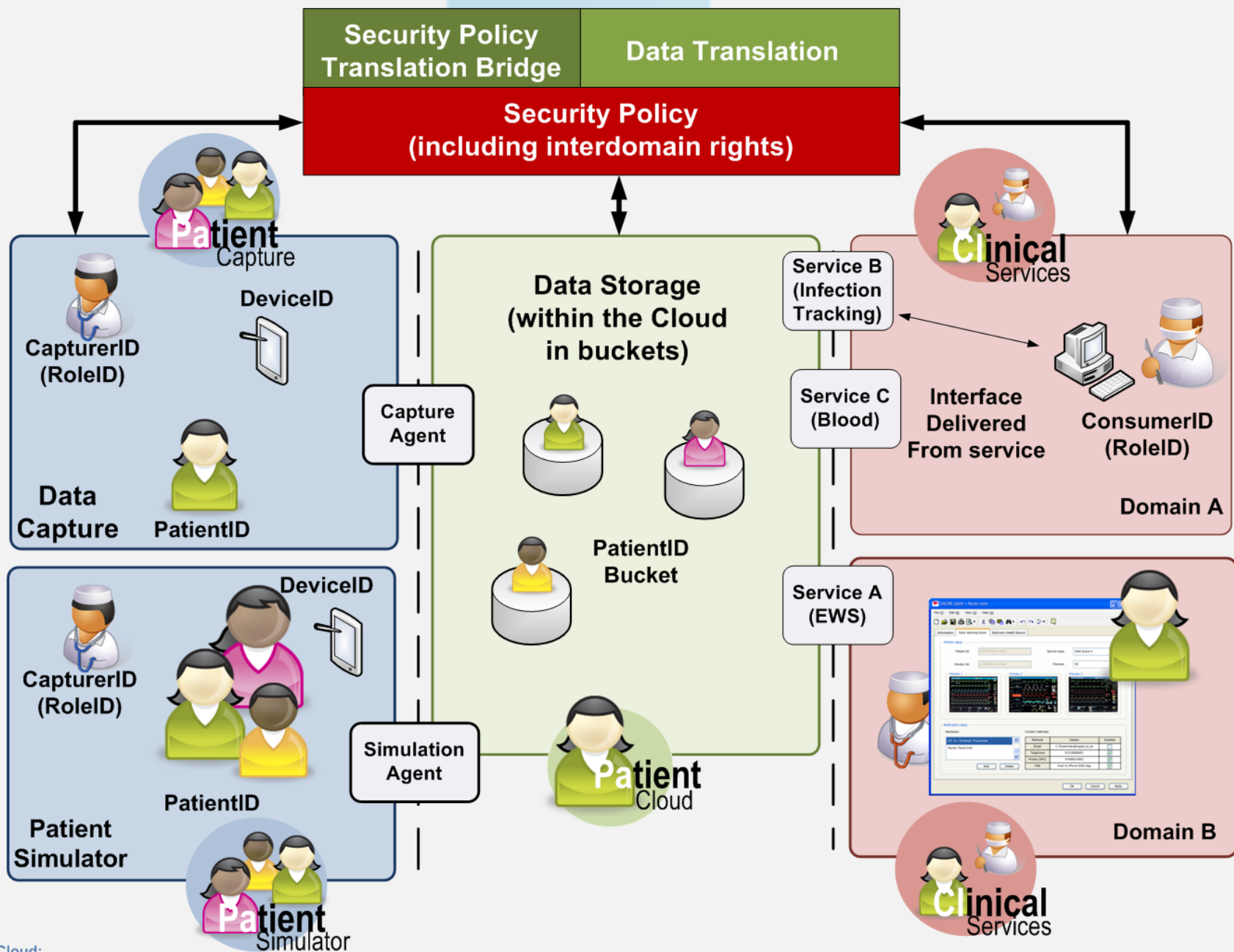
Dynamic  
Patient  
Records

Security Policy  
(including interdomain  
rights)

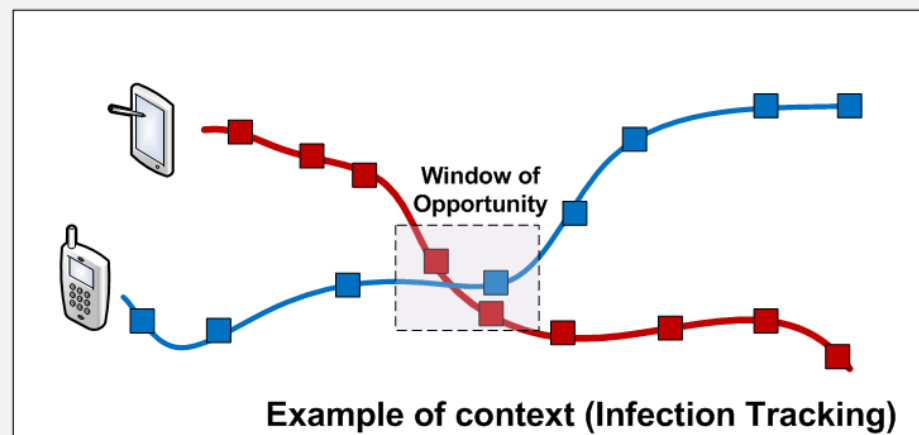
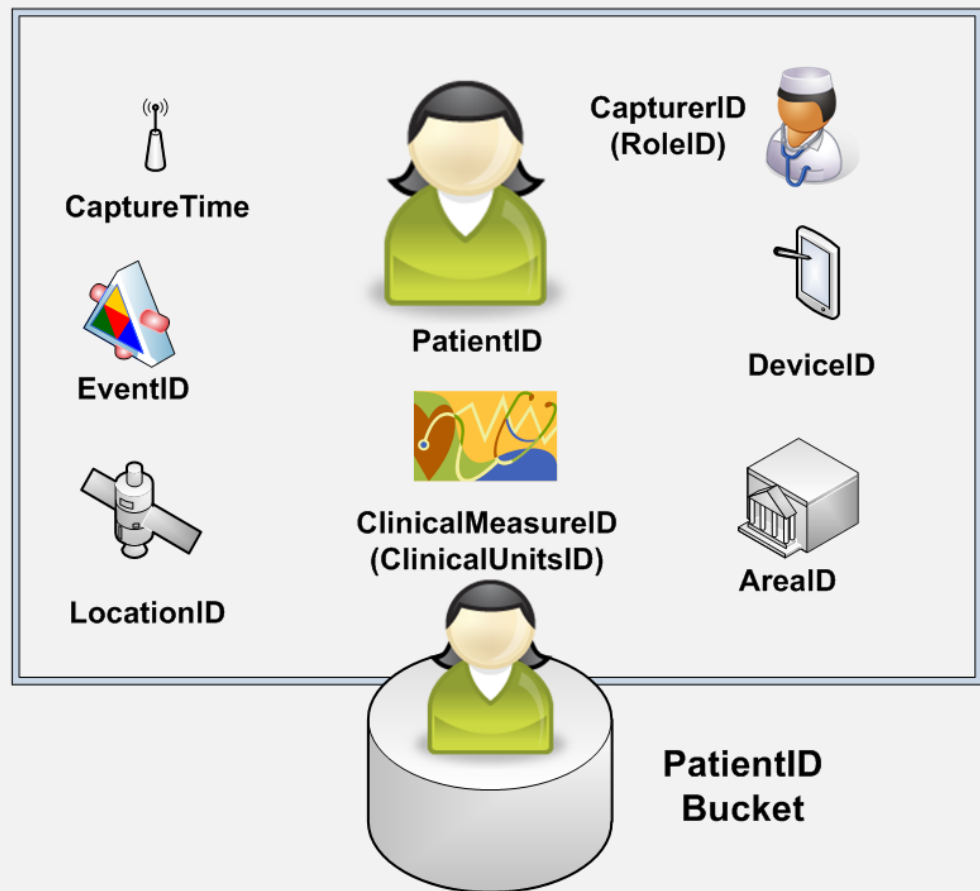
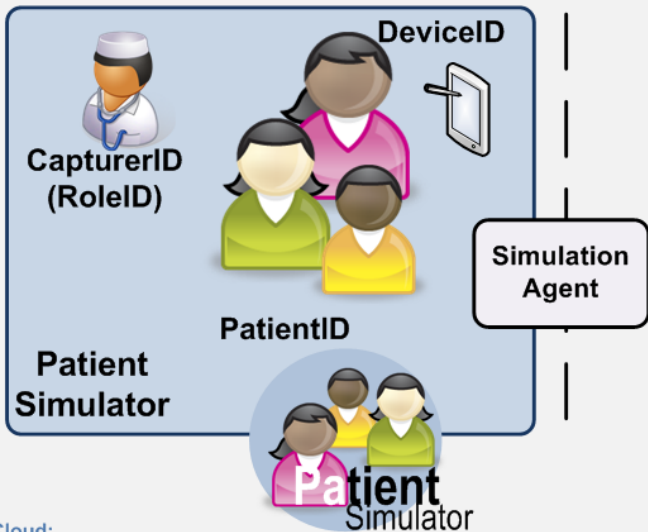
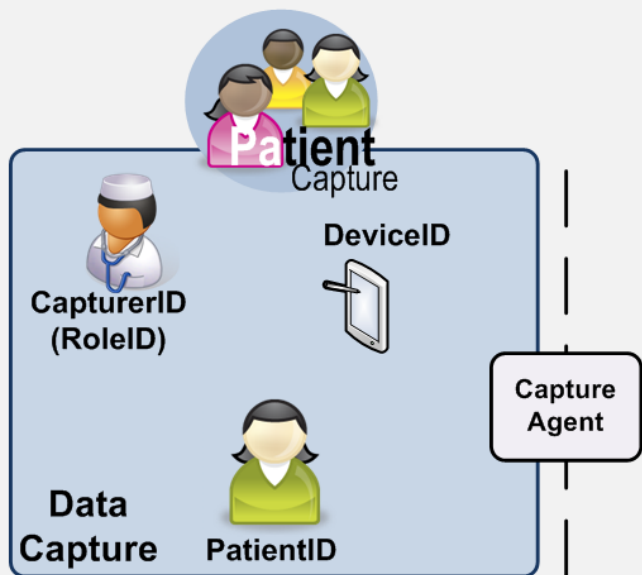


Why?

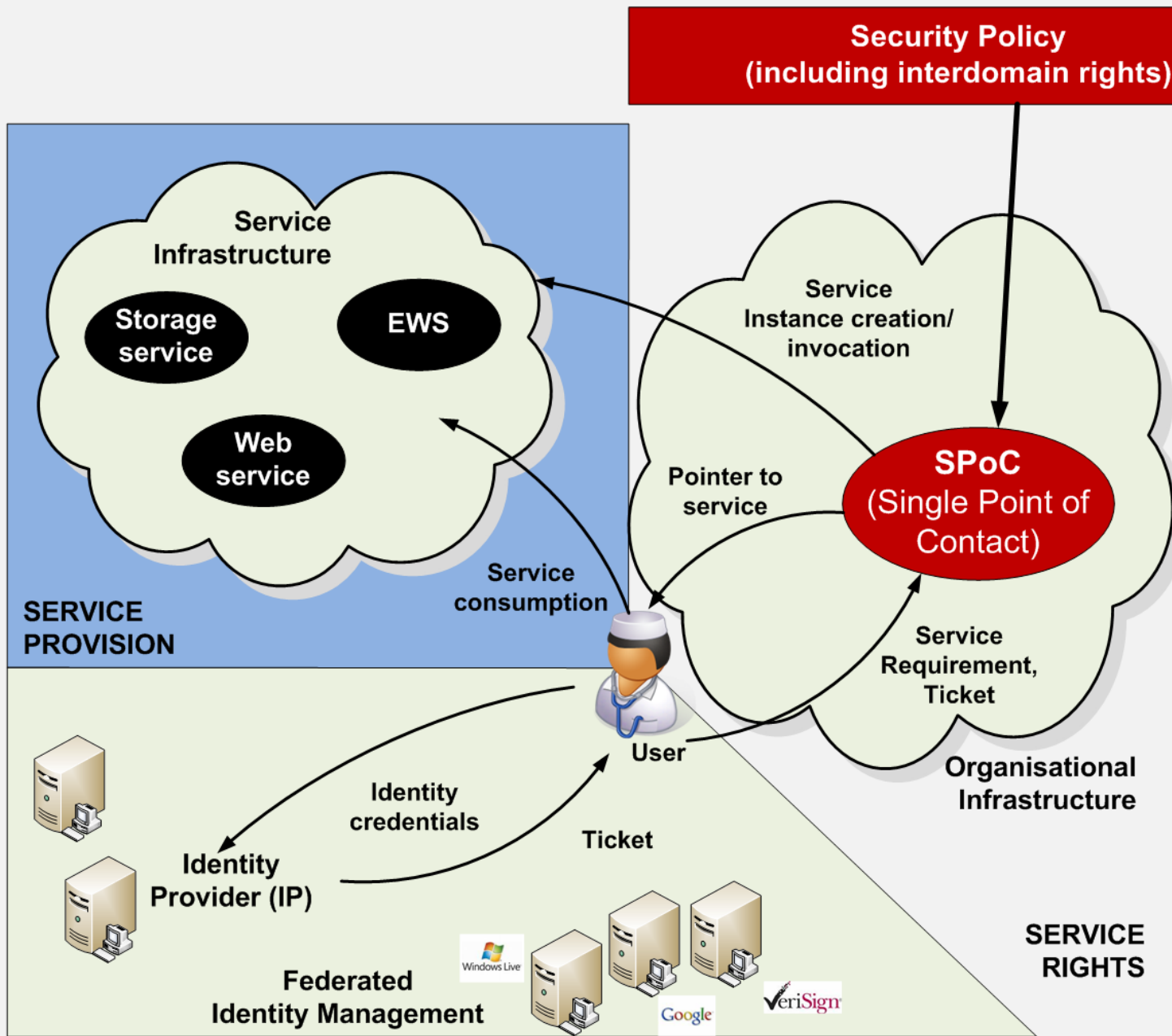












**SPoC**  
(Single Point of  
Contact)

**Security Policy**  
(including interdomain rights)

```
[permit] [Medical Staff] [C | R] [Temp | SpO2 | HR | BP | RR | Pain] of [Patient26078] with  
[EWS] from [Chelsea & Westminster Hospital] for [*] records in [P2010-12-30T00:00:00] using  
[Data Protection Act]
```

```
[permit | deny] [Requester] [C | R | U | D] [Attribute] of [Object] with [Context] from  
[Owner] for [N] records in [Time Window] using [Compliance].
```

A similar syntax is also applied to the request messages:

```
[Requester] [C | R | U | D] [Attribute] of [Object] with [Context] from [Owner] within  
[Start] to [End]
```

- { [permit | deny] This is part of the rule syntax which indicates the action of the rule. This defines whether a request meeting the rule criteria will be permitted or denied access.
- { [Requester] This identifies a request sender's role, e.g. GP, or pseudonym, e.g. 10420, or a combination of the two, e.g. GP10420.
- { [C | R | U | D] This defines detailed permissions for a requester to create, read, update and delete certain information.
- { [Attribute] This is a unit of information describing an object. An attribute may be a primitive data type, e.g. the pseudonym of an object as a string, or a complex data type, e.g. a person's ECG record for 45 seconds.
- { [Object] This is part of DACAR's system model. It refers to any entities in a healthcare scenario, about which information is held.
- { [Context] This identifies the reason why the information is being shared. The context governs the level of access and permissions associated with information exchange, and hence defines the priority accorded to information requests.
- { [Owner] This species a role with sufficient privileges to manage all aspects of an information source. The owner has the authority to allow or deny access to an information element, as required by legislation and defines responsibilities.
- { [N] records in [Time Window] This defines the number of records permitted over a period of time, where N can be any positive integer.
- { [Compliance] This refers to legislative requirements that support the exchange of information, such as the Data Protection Act, the Human Rights Act, the Freedom of Information Act and so on.
- { [Start] and [End] These identify the start and end of the date/time period over which information shown.

**DACAR client - Login**

Id Provider:

SPOC:

Username:

Password:

**DACAR client - Nurse view**

File Edit View Help

Information Early Warning Score Electronic Health Record

Monitor setup

Patient Id:  Service type:

Monitor Id:  Channel:

Preview 1 Preview 2 Preview 3

Notification setup

Receivers:

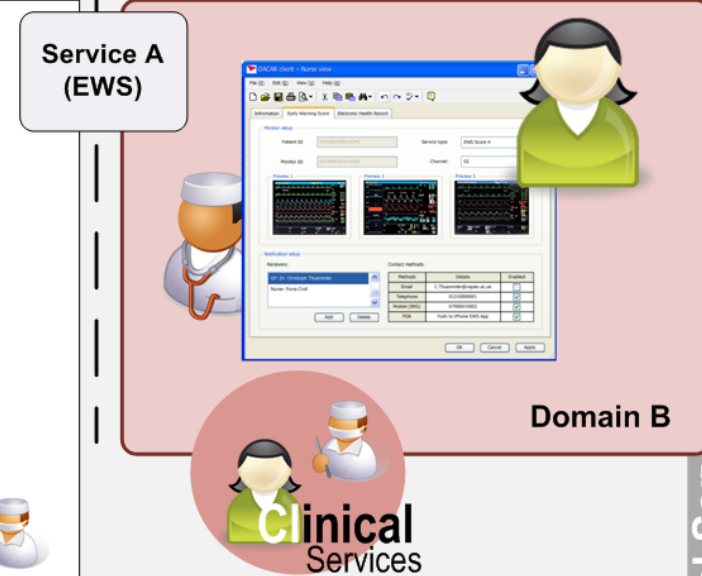
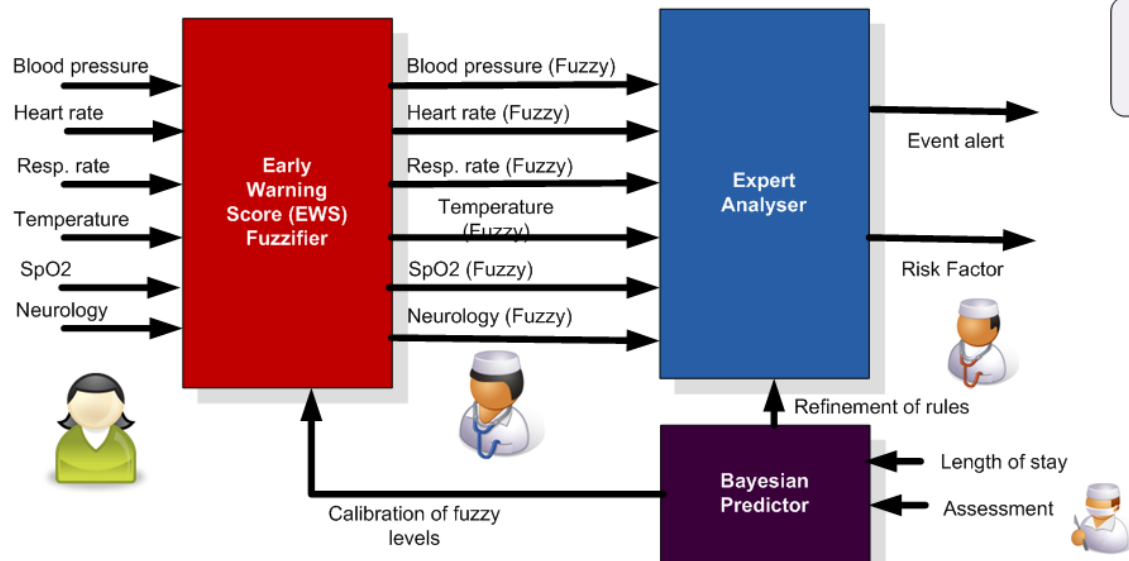
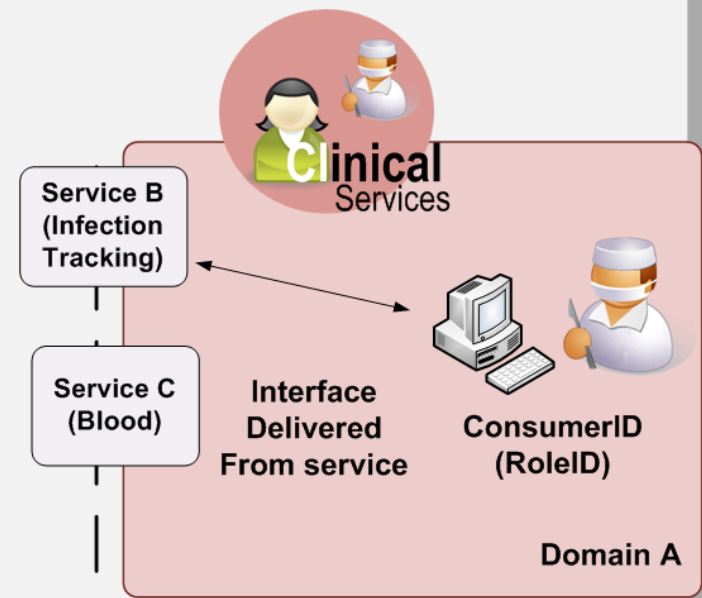
GP: Dr. Christoph Thuenmler

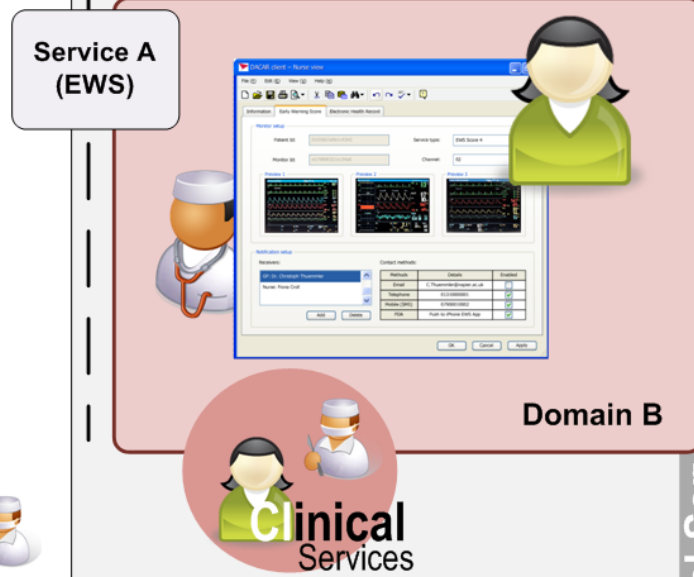
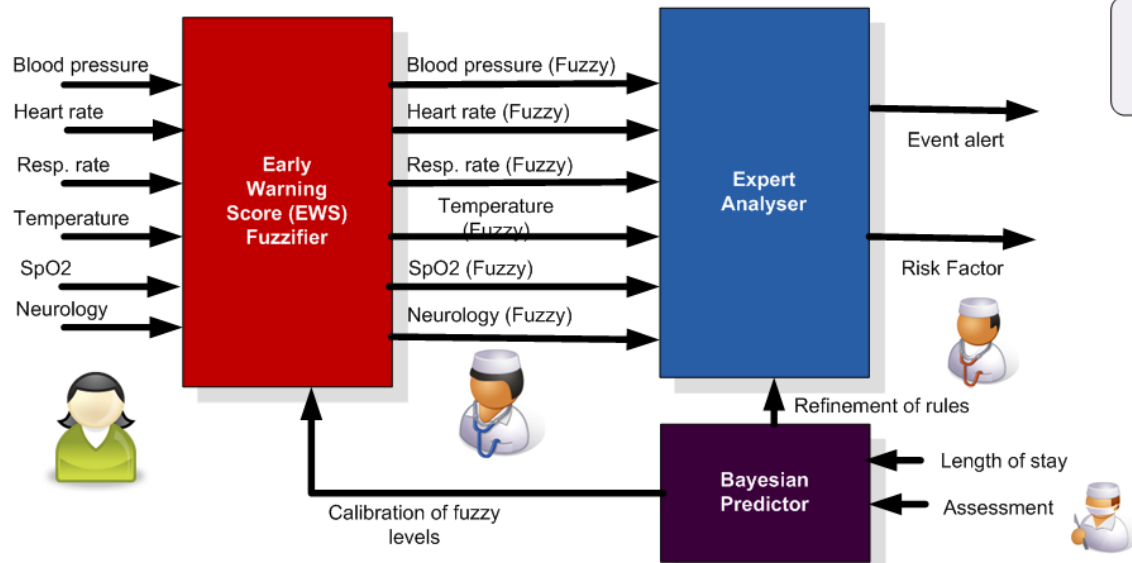
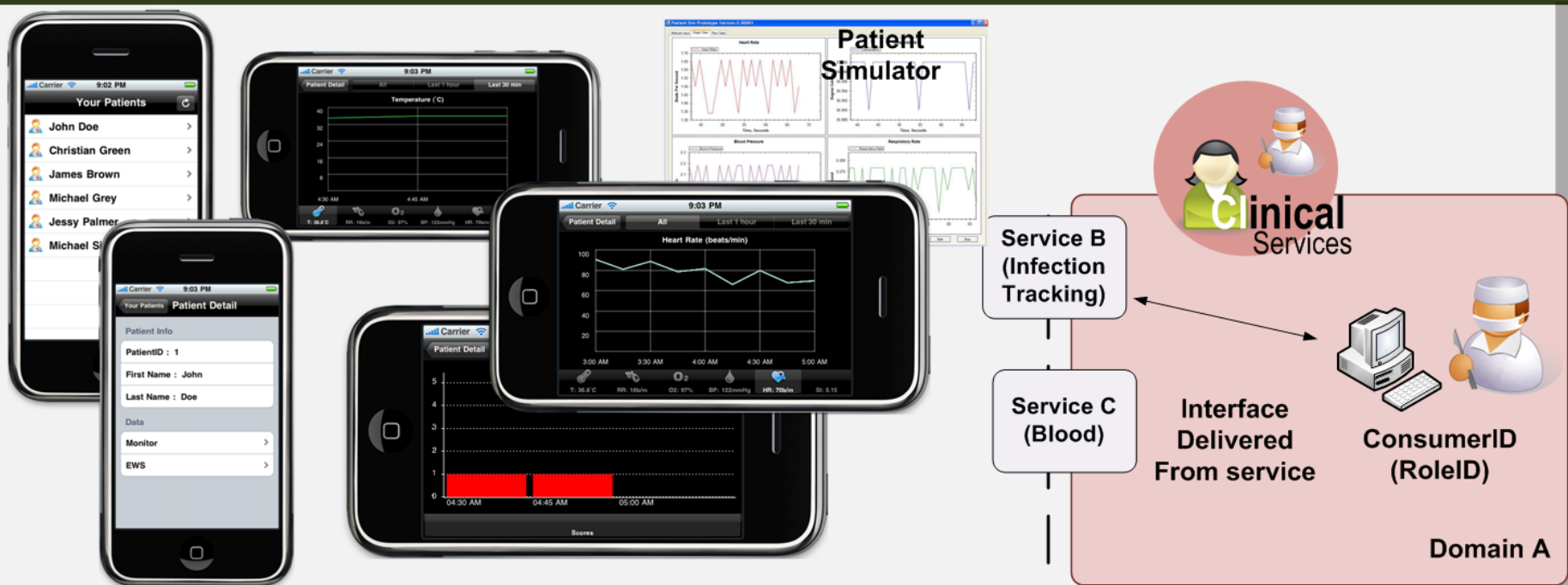
Nurse: Fiona Croll

Add Delete

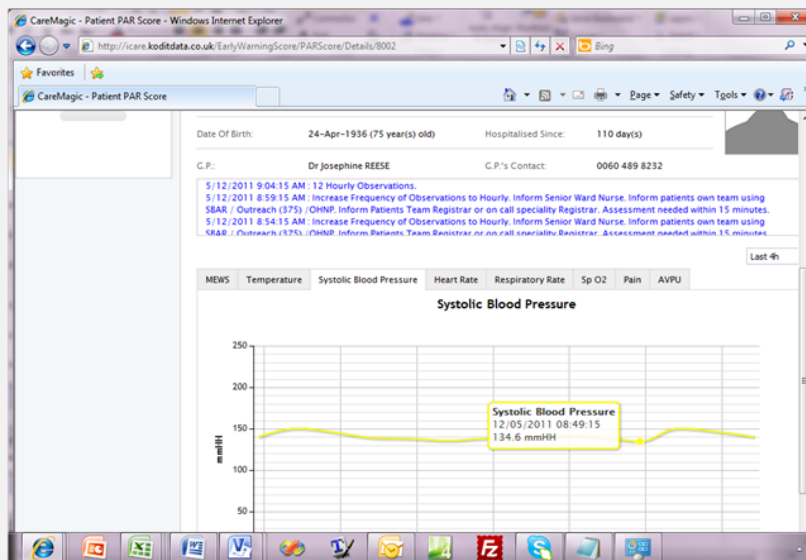
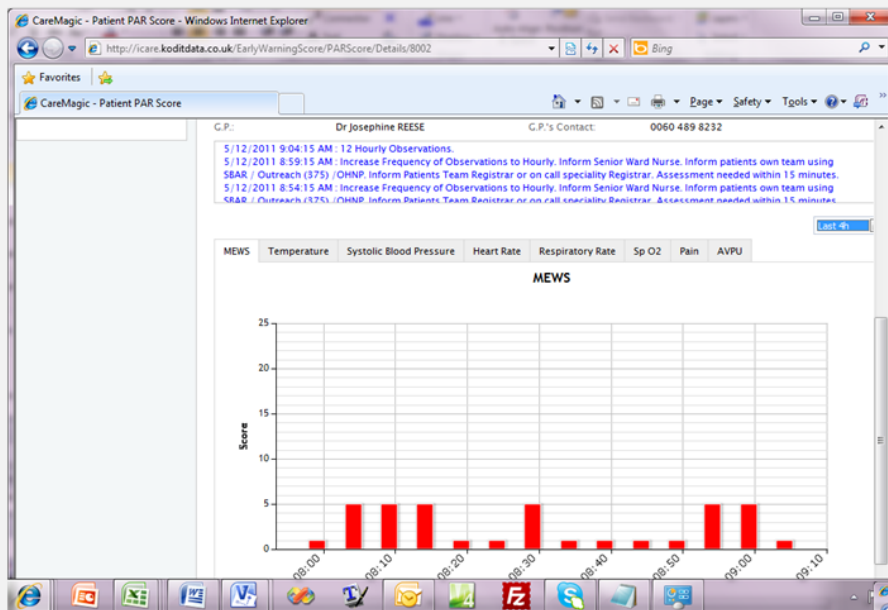
Contact methods:

Methods	Details	Enabled
Email	C.Thuenmler@napier.ac.uk	<input type="checkbox"/>
Telephone	0131 0000001	<input checked="" type="checkbox"/>
Mobile (SMS)	07906010002	<input checked="" type="checkbox"/>
PDA	Push to iPhone EWS App	<input checked="" type="checkbox"/>









CareMagic

File Staff Patients

Home Hospitals Wards Medical Staff Patients PAR Score Food Admissions Laserband Notifications Settings

Notifications

Last PAR Score

Food Pending

Hosp. Number	Patient Name	Last Score	G.P.
8000	Mr Wesley FRAZIER	5	Dr Josephine REESE (d1)
8002	Mr Barry GARRETT	5	Dr Josephine REESE (d1)
8001	Mr Kibo CARDNER	2	Dr Josephine REESE (d1)

Showing 1 to 3 of 3 entries

CareMagic

File Staff Patients

Home Hospitals Wards Medical Staff Patients PAR Score Food Admissions Laserband Notifications Settings

Notifications

Last PAR Score

Food Pending

Mr Barry GARRETT

8002

NHS Number: 851 732 0757

PAS Number:

Ward: Intensive Therapy Unit

Admit Date: 21-Jan-2011 19:01

Date Of Birth: 24-Apr-1936 (75 year(s) old)

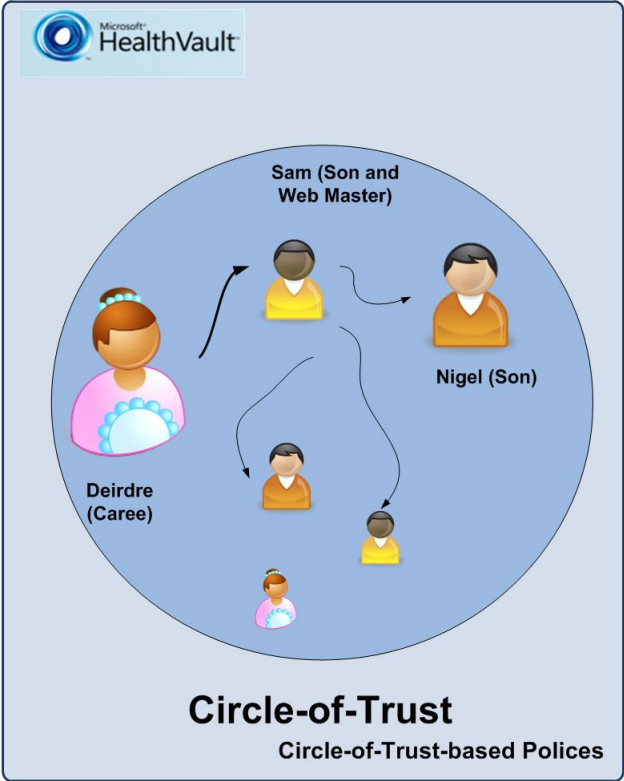
Hospitalised Since: 110 day(s)

G.P.: Dr Josephine REESE

G.P.'s Contact: 0060 489 8232

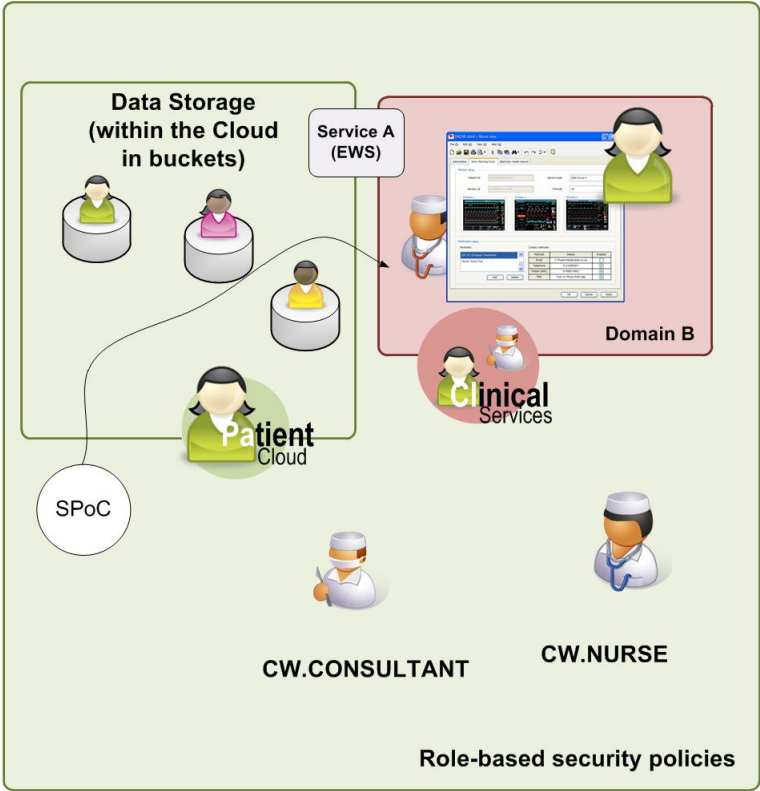


# Assisted Living



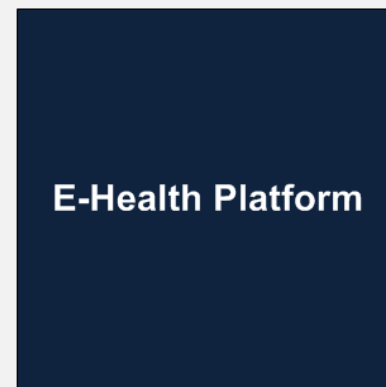
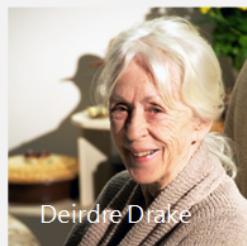
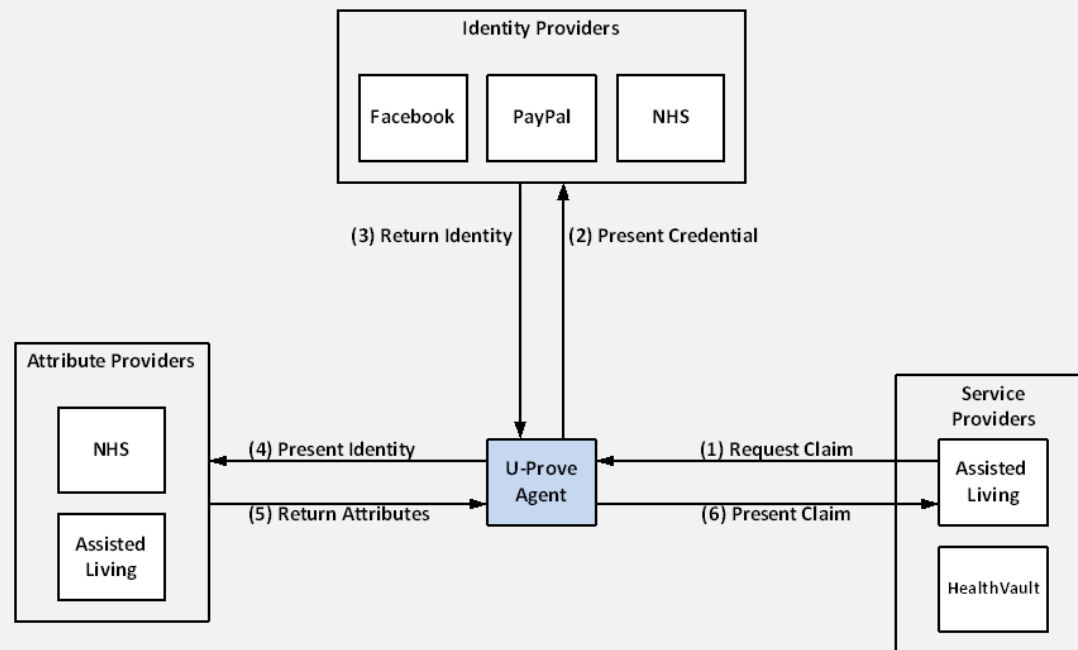
# Primary/Secondary Care

Translation Gateway (Security Policy/ ID Mapping)



```
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[permit | deny] [Requester] [C | R | U | D] [Attribute] of [Object] with [Context] from
[Owner] for [N] records in [Time Window] using [Compliance]
```



**CW.CONSULTANT**



**CW.NURSE**



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NHS Foundation Trust

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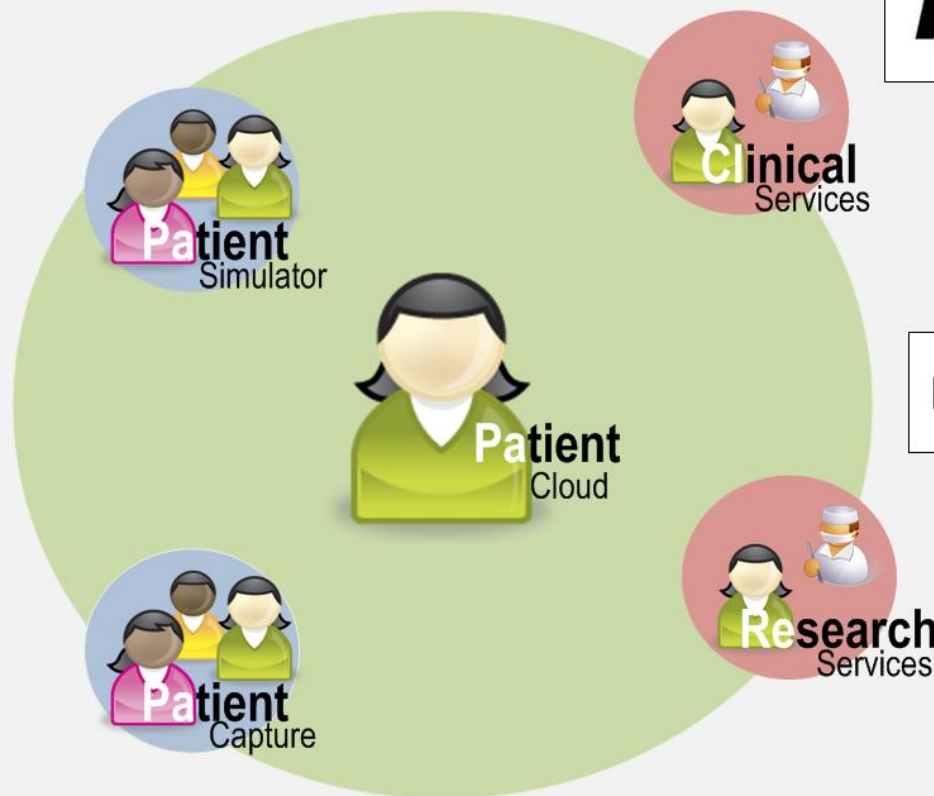
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