



England

Powering Digital Public Services: *Cloud migration for NHS Spine*

09 March 2023



National Platforms – Core Capabilities

Platform services and APIs used by the NHS systems and suppliers for primary and secondary care

	DEMOGRAPHICS AND PATIENT REGISTRATIONS	CLINICAL DATA SHARING	SECURE MESSAGING	ELECTRONIC PRESCRIPTIONS	STAFF IDENTITY	CITIZEN IDENTITY	COHORTING & COMMUNICATION MANAGER
PLATFORM CAPABILITIES	Provides the national electronic database store of NHS patient details, keyed by NHS number.	Provides national secure access to a range of clinical information, for the purposes of direct care.	Secure transfer of clinical data between care settings	Digital prescribing dispensing, tracking and digital signing for prescriptions.	Provides secure access to national systems for staff through smartcards.	NHS login provides an identity service for citizens to health and social care mobile/desktop applications and web-sites.	Complex clinical cohorting for national services such as Flu and Covid vaccinations
	Known for: PDS	Summary Care Record	Mesh	EPS	Smartcards	NHS login	Covid Therapeutics
HOSTING	On premise	On premise	On premise and Cloud – AWS	On premise	Cloud – AWS and Azure	Cloud – AWS	Cloud – AWS

NHS Spine Services



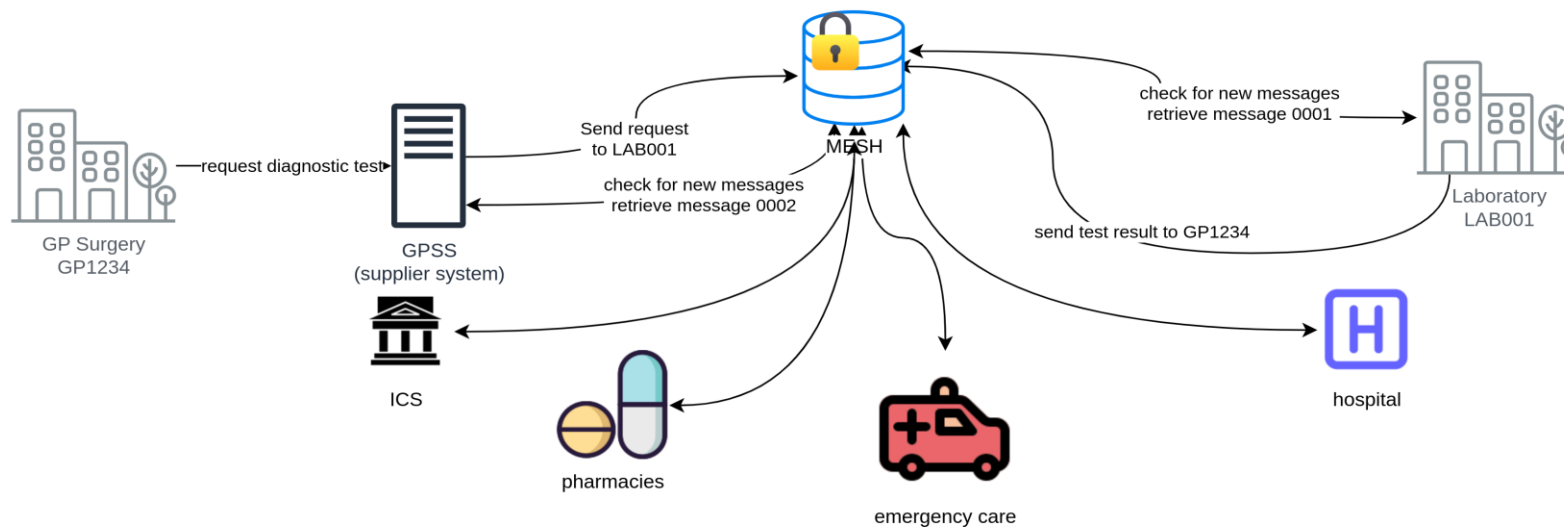
NHS Spine Characteristics

- **Widely used servicing over 26,000 health systems**
- **High availability, most services run 24 hours 365 days a year**
- **No scheduled downtime permitted**
- **High throughput, some services supporting over 3,500 API calls/second**
- **Classified as Critical National Infrastructure**
- **Developed in-house in Python and built on Riak database clusters**
- **Hosted in two data centres**



Starting Spine Public Cloud Migration

- Chose to migrate single service, MESH (Message Exchange for Social care and Health)
- Based on 7R cloud assessment MESH was re-architected to native cloud services
- Project took 1 year and MESH on the cloud went live December 2022



Last 30 Days:

Unique mesh mailboxes accessed per day **~= 22,000**

Messages: **33,066,272 / 3.2TB**

Data Received: **3.4TB**

Data Sent: **3.5TB**

Peak Pandemic: **~= 90-110M**
messages / month

What Did We Learn?

- **Re-architecting services was more expensive than expected**
- **Despite the service having well documented APIs, however we found a lot of undocumented features**
- **Applications needing a big bang migration will need many months parallel testing**
- **Cost effective designs are important and should:**
 - **Use serverless (lambdas) patterns wherever possible avoiding fixed instances**
 - **Use dev/test environments only when needed, avoiding running 24x7**
 - **Leverage auto scaling**
- **Cloud services have gaps for high availability services**



What worked well

- **Designing for reduced running cost, design for cloud services are around 30% cheaper to run on the cloud**
- **Having clear controls and guidelines on building secure software on the cloud before starting**
- **Resilience of cloud services has been excellent running high availability services across three sites/zones**
- **Leveraging flexibility of the cloud to enable quicker feature build and deployment**
- **Having close partnership with the cloud supplier**



What's next

- **Rehosting of Spine in cloud, followed by replatforming**
- **Cloud optimisation to take advantage of managed, serverless technologies in particular at the database layer**
- **Standardising of Spine APIs to create single 'front doors' to the Spine services**
- **Development of Event management services to support loose coupling of the Spine services**





NHS
England

Thank You

nhsdigital.spinefutures@nhs.net