A definition of the cloud

Cloud computing is a model for enabling ubiquitous, convenient, on demand network access to a shared pool of configurable resources (e.g., networks, server, storage, apps and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction NIST National Institute of Standards and Technology.

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Discussion points

What does NHS want from cloud, what needs to be included and what needs to be changed in order to suitable for the NHS? If cloud is the answer what is the question?

Is there a bottom up approach? NHS version of HTML/web?

Cloud national or local, bottom up or top down and justifications for each

How did the data get entered? Scanning is a whole host of problems.

We need to resolve who owns the data. Does the NHS derive the system?

If there’s commercial ownership there’s economic pressure to sort it. Who has ownership and who needs to solve the problem it encounters?

What sort of architecture allows for doctor as well as patient needs?

What is the back-up plan for failure?

What solutions do we need to overcome separation of problems between departments and security?

What is the vision?

Campaign plan for complex solution

How to achieve an integrated solution

Measures of success

Vision

Vision is needs rather than technology. We need to get the vision at local commissioning group level and they need to know how to progress it.

Easy to enter and access all pertinent data

Easier to use aggregated data for secondary uses

Flow of information across sites – technology and non-technology

Patient focussed – information and for use

Security. Access control rules - legal and professional rights of access to data, better access to those who need it and restrictions among employees

Shouldn’t be only a record system but interactive experience where users can set alarms/alerts for patients and healthcare professionals – system pushes users to do things right, a proactive system

Proper discussion of what is needed before computer makes it happen

Delivery is not a single national NHS service but lots of different clouds with good communication between them

Privacy. Tight controls on access within the organisation e.g. don’t just get access because you work in organisation so the whole patient record is not available to everyone. Mechanism that GP/clinicians can access but there are filters specified on role of person/time/from which organisation/need

NHS needs to learn to specify appropriate levels of service i.e. availability, disaster recovery and resilience

Recognise that different media are appropriate to different tasks, not paperless but paper light

Not only clinical but could be resource data, where patients are in the system. transactional tasks of the patient needs to be much better joined.

Right data right time right place.

Works for chronic and acute, access to data that is not in your organisation, this is largely relevant to chronic disease as it can help stop patients coming into hospital and keep them out when discharged.

Vendor dependency (if not self-hosting) subscription and broadband costs, no vendor at all or surrendering data to 3rd party

Nothing is ever gone even if deleted – unwanted data

Need to think about data quality – how does it get there, who’s providing it and what quality
Standards for software/hardware, existing technology, interpretation and recording
Needs an environment suitable for implementing with flexibility built in and leadership at every level.
Framework for effectively scaling up not top down would work
Creating something based on medical HTML, patients have home page with structure and links.
There are legal and professional roles and patient access controls. These controls should be made explicit not hidden. Use cases should be produced to define different views and matching access control groups. There is confusion about how to interpret the law in this area, which means that legal requirements are not well translated onto IT systems. Legal requirements need to be clarified.
What is the user-friendly device that can accommodate these things? Needs to be easy to use and not require training. This is not organisationally defined and available when and where needed.
Patient focus has two components: All pertinent data is available to HCP’s wherever gathered, and patients need to access their own records

Open Source
Open source is relevant to the future of the hospital
Open source software is software whose source code is published and made available to the public, enabling anyone to copy, modify and redistribute the source code without paying fees.
• Growing pool of healthcare tailored to open solutions
• Cost saver – its free
• Growing pool of freelance workforce
• Independence from costly 3rd party vendors
E.G. openEMR
Positive reasons for open source
• Free to use, distribute, and modify
• Lower costs (most cases this is only a fraction of the cost of their commercial counterparts)
• Can be more secured as the code is accessible to everyone.
• Anyone can fix bugs as they are found, and users do not have to wait for the next release. Code is continuously analysed by a large community produces secure and stable code.
• Dangerous! Two sided coin – also potential security flaws can be detected and published easily and exploited faster – cat and mouse game!
• Not dependent on the company
• Uses open standards accessible to everyone; thus, it does not have the problem of incompatible formats that exist in proprietary software.
• Not have to think about complex licensing models but careful some licenses require additional modifications also be released as freeware

Issues, questions and critique
• Managerial/political will
• Clinician’s willingness to change
• Professional standards needed to underpin.
• What evidence do you need on IT solutions? RCT’s? Can we get evidence from a more cheap and cheerful resource? NHS CB refers to examples in the private sector, patient experiences, measures and costs.
• Do we develop a paperless or paper light system? Paper has its own benefits – robust, built in workflow, quicker to use. Benefits of IT is that information follows the patient and it can be reused and have a secondary use.

• We need to assess the comprehensibility to patients of clinical records. Do patients need them? How do we involve the patients with not extra effort and work for clinicians? Coded records could link to explanatory text tailored for patient, written for one purpose and time. If the text can be correctly linked to existing records then the records can be open for patients use.

• Vendor dependency (if not self-hosting)

• Training required

• Maybe compatibility issues when running other priority platforms

• Many parallel open source software, which one is best?

• Security flaws

• Quality

• Support

• License infringement

• Migration costs

• Gaining and maintaining compliance to NHS standards

• It just sounds too risky

**How to get there**

The problem is volatile, ambiguous, messy etc. We need a structure to place over the top

*Establish the vision ➠ Centre of gravity ➠ End State*

**Establish the vision**

Know the direction we are going to travel we need to know where were going and when we’ve got there, energise people to follow us.

Within this there is a centre of gravity – if we do not achieve we are unlikely to gain success. There are a series of questions we can answer to get to this. There will be time factors and we assign times for each phase

1 understand the problem

2 implement the solutions subdivided into transformation and anchoring in the culture

3 evaluate the success put process in at this point

**Centre of Gravity**

The COG is a central framework of standards with certain key indicators, data quality or security vs. ease of access. Key indicators must be completed and achieved to overcome the centre of gravity and to guarantee a success of the operation.

Centre of gravity (COG) is not the main effort but they interlinked. What do we focus resources on to meet COG?

Cultural change – don’t tackle culture in isolation environment can change, showcase success. Develop early wins and stories so people gather behind it. Will change attitudes in individuals and this will change culture within organisation NHS responds well to how we see success in military crisis. Get the message out there that it’s a critical problem.

Who has money to spend and on what. Vision needs to be shared by those who have the money about managerial will and investment. Spending in line with this, needs to be in line with COG.
COG — professional attitude — it’s a scandal we have no computers. But when it comes down to it, we don’t know if they have the vision. The cardiothoracic surgeons have data but they only want it for their own need.

Easy for them to access the data they want for their own objectives. Pertinence is really critical. What do people want this for? Additional benefits by secondary access.

COG credible safe integrated architecture. This is about a product, to another its about process where products form integrated. Coherent processes can still map onto this. There will be some clinicians not moving. Make it easy for them to stay but see benefits of doing more they can move outward. Keep it working while you change it hence ease of entering.

COG investment profile. Williness to change way they work. Good as long as change not disaster for them, good for small gains. Maintaining willingness fits with COG.

Connecting for health – buying systems as commodities. We need to get organisations to change. Even if successful, it would not have met the vision. If you do not get control of investment, we will not have success.

Maintenance of will COG.

COG acceptability of change of behaviour is key is Royal colleges accept it. Driver and removes a barrier. Can’t go and hide from computerised prescribing because RCP has said that its cheaper and the way forward.

Professional standards connect up.

What stops you getting the right solution? Keeping on board consultants, lack of leadership shared vision and political will. Deliberately decentralised

The starfish and the spider – starfish leaderless, spider is military.

Happy putting data in and getting what they want out. Ease of input and retrieval of data another suggested COG.

Investment has been controlled by people that didn’t hold the same views. Infrastructure can be one line.

**End state**

End state lower unit cost of process. Do things needed to be done in cheaper setting. Better patient safety – 1. Remove discontinuities make better decision. 2. Reminders and alerts, system reminds us what we forget at the moment.

Decisively definable – the end state can be…

Better care for people, high level of patient experience, cost efficient use of workforce,

Divide this down into manageable chunks or lines of operation

What are we doing in terms of clinicians, IT, patients, and public?

Can be broken into activities, communication across stakeholders

Within these lines there are decision points to show we have completed the task. There may be what we call a branch plan – we don’t achieve this particular point so this is a contingency plan along the way in case decisive points are not met.

**Culture change**

**Specific issues to be addressed**

Bottom up or top down / local or national

How collect / record the data

Who owns the data

What if it goes wrong

Access vs security

**Why is the cloud relevant to the hospital of the future?**

Lots of data to store for one patient
• Aging population
• Healthcare services are getting bigger and better
• Growing again population with more demands for care
• Leads to an incredible amount of data that needs to be stored, administered, protected and made available 24/7 for decades

Clouds can greatly increase IT efficiency
✓ Manageability – integrates always up to date
✓ Scalability small to large
✓ Cost savings operational costs

**Positive reasons for the cloud**
- Low start-up costs
- Availability
- Low maintenance
- Resource optimisation
- Thin clients and visualisation of applications cheaper
- Hardware savings (centralised image, single update and then release rather than 1000 updates) devices
- Enables mobility – pervasive and mobile computing
- Energy savings
- **Time factor** – even if it just saves a few seconds via login (30) over time it would save hours for staff to focus on patient
- **Back up structure** handled by provider / company, secure against loss or disaster etc.
- Way to streamline workflow
- **Again scalability** saving money – (there is no need to buy infrastructure or hardware that is not needed other than buying standard packages)
- Use of clouds will improve patient safety and experience as you remove discontinuities, people know things they wouldn’t have previously have known
- Will help unit costs as you can stop patients coming into hospital – these objectives need measures. What measures?

**Final notes**

Patients aren’t just the ones in hospital. Could have patient experience – being demonstrated as outcome with surveys currently.

Measure the right thing with the right population. Health as nation not quality of life - being reflected in patient experience.

What do we mean by “patients”. People? Very hard to quantify and measure at the end.

You implement, evaluate whether you achieve end state. Evaluate whether implementation has worked.

What level do we look at to know if we are getting it right? How are we going to measure the success?

What level? National? Wales? England? Have to get this sorted before components sorted out. Wales as case study clinically led vision articulated well but turned out to be no longer sustainable. Hijacked as organisational systems were taking it forward, people who came into didn’t agree. They controlled investment and weren’t signed up to vision. One counter example is NHS renal patient view. No concept of organisation but allows patients to look.

Culture will change through success that people can define. Organisational set up allow transformational change? It is being encouraged to fragment but every meeting says we need to join more. Structure cannot pull in opposite direction. Communities of interest appearing regardless of
structure and these are easier to do technologically every year. Going to do it despite organisational structure rather than because of it.

Other relevant topics for future consideration – mobile devices

As people become more connected world core mobile devices are increasingly important. We need to make sure that mobile devices have a great user experience, excellent security and can be managed effectively across an organisation.