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National Resilience Extranet (Task One)

Technical Solutions to Deliver the NRE:
a Market Survey and Assessment of Options

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▼ **Introduction, the NRE and the NG-NRE**

▼ Four Technical Architecture Solutions

▼ Industry Workshop

▼ Conclusions & Recommendations

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Project Task

◥ Cabinet Office Civil Contingencies Secretariat (CCS) is considering options for procuring a replacement of the National Resilience Extranet (NRE) = "Next Generation NRE" (NG-NRE)

◥ Current NRE contract, unless extended, expires Sep 2013

◥ Task: "Undertake a market survey of technical solutions to deliver the NRE.

　◥ This will include the identification of candidate technical solutions that are available to deliver the NG-NRE. A short analysis of each solution will be undertaken to identify what it provides, and how it compares to other options."

　◥ *Note: In agreement with Cabinet Office CCS, Niteworks undertook a survey of the architectural options, and did not compare any one company's products or services against another's.*

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Approach & Activities

The Niteworks Team identified the following activities as its method of undertaking the task:

1. Gain a thorough understanding of the current NRE
2. Develop NG-NRE Concept of Operations and Concept of Use
   - "Concept of Operations" and "Concept of Use" documents address *how* a system should be used rather than *what* the system is or does (which is defined in the requirement).
3. Assess NRE
4. Engage with CCS and the Stakeholder Community
5. Examine user requirements & constraints for NG-NRE
6. Hold and industry workshop to identify possible solutions
7. Analyse project team findings against industry findings
8. Provide conclusions & recommendations

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1. In order to have a better feel for the Next Generation NRE it was important to comprehend what the NRE was, its purpose, when it was required, how it would be utilised, and by whom? There is no doctrinal information including the concept of operation or use in existence at this moment in time. There are standard operating procedures that are available for the use of the NRE within the geographical constraints of the local emergency planners and services, but this rarely transits across county borders.

2. Examination of the current document sets for the NRE was an important part of the approach. Apart from the open source information available on the internet, there is little documentation available on the High and Low level design of the current system. Ultra and BT may have this information, however it was not made readily available for this project.

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3. A number of documents were made available by the Civil Contingency Secretariat (CCS) from a working group looking at the problems with NRE
4. The draft user requirements document was made available from the CCS which will be broken out in the requirement section. There were a number of constraints made upon the NG-NRE. These constraints where highlighted during the consultation process, however they were not enforced as a blocker to future technical solutions. These included items such as no renewing of contract, must be delivered by Sept 2013, available anywhere, anytime on any device up to and including IL3 without the requirement for security certificates as this complicated matters for the end user and reduction in cost due to advancement in technologies.
5. All documentation and informal interviews were consolidated and reviewed. This consolidated information allowed for the creation of the industry workshop in order to garner advice from industry thus allowing the removal of bias from the project team. A One day industry workshop was held seeking advice on best practice, incentive and way forward
6. Workshop findings were summarised and compared to project team findings
7. Production of executive summary and this slide pack for further information
8. Presentation of findings to CCS

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Current NRE

- A means of sharing of information between emergency responders including those without GSi, PNN or other secure accounts
- Multi-agency contact during planning and response
- A one-stop shop for documentation, briefs, situation reports and Common Recognised Information Pictures
- A resilient system with generous data storage, mirrored back-up and a geographical fall-back system
- An aid to collaborative working
- Manages requests and offers for mutual aid and assistance
- Provides open and shared calendars
- Automated administration of organisation events

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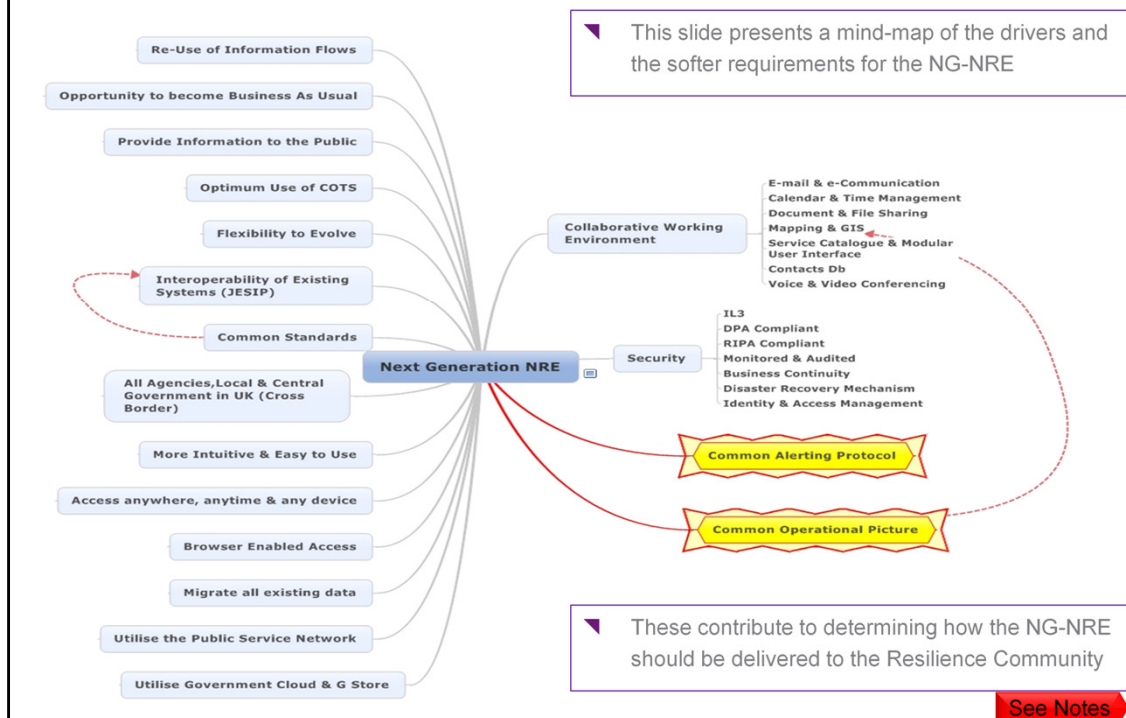
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Working Requirement for NG-NRE

Here is Niteworks' high-level working requirement for NG-NRE:

1. Must provide current NRE functionality as baseline
2. Must be available to all category 1 and 2 responders
3. Provide information sharing up to IL3
4. Provide intuitive information sharing locally, regional & nationally
5. Host National, Regional and Local Resilience Forum contact lists
6. Enable multi agency contact for planning and response
7. Allow web-browsing access utilising approved systems
8. Provide reference library across responder community and other designated users (Government, military, etc)
9. Must be resilient and available 24hrs/day x 365 days/year
10. Must provide Confidentiality, Integrity and Availability of data
11. Must provide data disaster recovery mechanism
12. All existing NRE data must migrate to NG-NRE
13. Should follow government ICT strategy where possible

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1. The NG NRE must have all aspects of the current NRE as a minimum baseline. Further functionality can be built in with time
2. Includes "Blue Lights", Government bodies, Utilities etc.
3. The system should allow information sharing up to and including IL3 (RESTRICTED)
4. The system should be intuitive to the end user and the minimum amount of training requirement
5. It should allow for data sharing across geographical boundaries locally and nationally and allow for inter agency sharing
6. Allow for planning considerations when dealing with an emergency between different 1st and 2nd category responder communities
7. Allow for connectivity via web browser, utilising GSI, PNN, PSN or other secure accounts. CoCo should be agreed and simplified. At present security certificate process is too complicated for end user
8. During an emergency provide a one stop shop and reference library for documents and guidance across responder community including plans, protocols and multi agency documentation up to RESTRICTED
9. Must be resilient and available 24/7 for 365 days per year
10. Data must have the necessary confidentiality, integrity and authenticity as to its purpose on the system
11. The data must have a disaster recovery mechanism in the form of data backups that are tested regularly
12. All data must be migrated to the new system
13. The system, where possible should follow the Government ICT strategy

Key high level drivers:

- A place to share information
- A place to work collaboratively
- A place to find information
- Simple and customisable by end user
- Business as Usual
- Free for end user

- Re-Use of Information Flows
- This may become the desktop tool that is used for current day to day multi agency information exchange and planning
- May provide updates to the public on relevant situational awareness (although there are many tools for this available on data.gov for normal day to day information)
- Utilise COTS and not bespoke solutions. This may drive down cost and allow the private sector to carry out elements of R&D
- Flexibility to evolve as new technology comes along
- System should interoperate with legacy systems. There is a programme for this JESIP – Joint Emergency Services Inter-operability programme – Home Office & Cabinet Office approved
- Commonality of standards for data and operating procedures etc.
- The system will allow all agencies to communicate and collaborate regardless of geographic boundary, local or central government and should be customisable to allow for the agencies to have their own look and feel (tartan look)

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- The GUI should be customisable and easy to use. Think of how easy it is for a user to pick up an smart phone or tablet and within a short period of time to utilise many of the applications available
- Access anywhere, anytime and on any government approved device
- Browser enabled access across the common variants.
- Migrate all existing NRE data.
- Utilise the PSN, G Cloud and store which may take away complexity of managed services from the customer.
- Collaborative working environment will not lose current functionality but must have ability to grow with new functionality including mapping and GIS. Should have a modular interface that the end user can customise to their own preference and a catalogue that allows for the user to select functions as and when they are required.
- Security should allow for all listed and the functionality to move from IL0 through to IL3 in line with the PSN security strategy.
- System should allow for resilience through business continuity best practice with a disaster recovery mechanism should the worst scenario happen.
- There should be a simplified method of identity and access management implemented.
- Any future system should take note of the possibility of a Common Alerting Protocol that will allow capture of automated alerts to be utilised for populating alerting information.
- The Common Operational Picture is future functionality that is to be considered as part of the programme. This will allow for capture and dissemination of the current and planned situational picture to all those services that require it when necessary

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Technical Architecture Solutions

1. Current NRE functionality, delivered by incumbent
2. Augment NRE functionality of current system, provided by incumbent
3. Procure a new industry-provided solution to provide NG-NRE functionality, delivered through open competition
4. Government Cloud-based solution: NG-NRE following Government ICT strategy moving onto PSN, G-Host and G-Cloud

◤ The following slides present, for each of the technical architecture solutions, a definition, a SWOT analysis and an assessment

See Notes

There were four key findings for the High level technical architecture solutions. These findings were identified from the project team research and information gathered from industry and deconstructed to provide what would be possible. Each solution is shown with a SWOT analysis and assessment presented.

1. Continue with current NRE as delivered by incumbent. This is a lower–risk route that provides more time to specify and procure the NG-NRE.
2. Refresh of current NRE. This would be the latest version 3 from the current incumbent with added functionality and an improved graphical user interface. This is a fairly low risk means to deliver a better NRE, while preparing to specify and procure the NG-NRE
3. Utilise the current NRE concept with added functionality. This would be delivered through open competition. This may be a faster route to delivering the NG-NRE, which carries significant risk of delay and shortcomings in performance.
4. A new NG-NRE created from a new design, utilising the latest technology, following the Government ICT strategy, moving on to the Public Services Network. This would see the NG-NRE as the government innovators utilising the latest concepts and technologies to deliver capability. This is a fairly high risk strategy due to delivery times, maturity level of PSN, suppliers accreditation on the G-Cloud store and the infancy of the overall concept. Can the NG-NRE mission critical system afford to be the innovators at this time?

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There were a number of key principles that were derived from industry that are applicable across all possible solutions:

- Concentrate on the basics, if these are captured correctly the rest will follow with time
- Do not overly prescribe the solution. Let industry complete this from the requirements
- Design in terms of required outcome of NG-NRE
- Define how it is to be used
- Define the workflows
- Early stakeholder buy-in to the requirements ensuring co-operation
- Explain the approach to change management
- Explain the benefits to user community

Current NRE
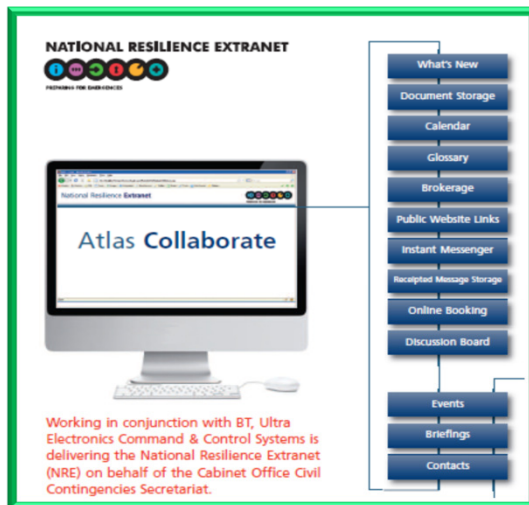
> ◥ This diagram is an extract from a Cabinet Office document showing the current NRE functionality

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Current NRE

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Strengths
- Available now
- It works
- Existing security model
- No break in 24/7 service
- Reduction in risk

Weakness
- User perception of change
- No uptake on licencing
- Does not provide mapping
- No improvement of service
- No governance
- Only buys time

Current NRE

Opportunities
- Buys time to plan for future
- Allows other departments to test Government ICT Strategy
- Mandate use of NRE nationally

Threats
- No user buy in
- User dissatisfaction
- No permission to extend contract

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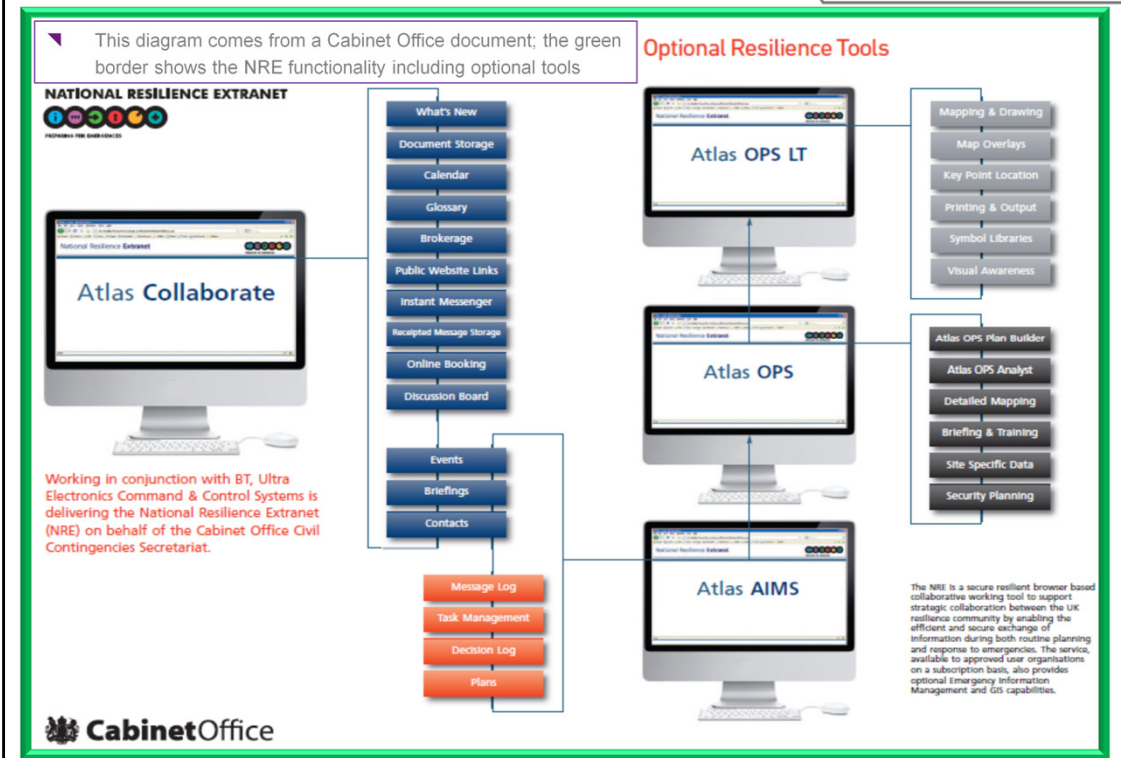# Assessment Technical Solution 1: Current NRE

1. Ready now $\Rightarrow$ No break in service or change to current system
2. Breathing space to implement new system
3. Not a long term solution to current problem

Continue with current NRE as delivered by incumbent

This is a low-risk strategy that provides more time to specify and procure the NG-NRE

     Ref: NW/Pj/Res Comms/4900 Ver 1.1 Final   15   See Notes

There are a number of key points that extending the current solution highlights for the customer. These are as follows:

- There is no improvement in service to the end user. This means that the current status quo of poor user take up in procuring licences will carry on. This has a knock on effect to the service provider for the profitability of the system. Fortunately the current service provider is hosting their services to other external agencies and this is allowing for further development of their product. Continuing with the current service will mean that the Government will have in place a system should a major incident take place. This will allow for coverage until another system can be procured, tested, implemented and validated.
- The current NRE has had extensive accreditation checks including penetration testing. This was a lengthy process in excess of 1 year. Accreditation will have to stay current for the NRE, however this is a major hurdle that meets the government accreditor requirements
- There will need to be a high element of customer and supplier expectation management in order for their to be continued use of the current system. There is a danger that the user will not invest time and money in the current system due to perception that the system will soon change so there is no point in carrying on.
- This is not a long term solution; this will only allow for a system to be in place for one year or less until something else can be procured.
- Concept of Operations and Concept of Use is required for any system now.

Augmented NRE

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Assessment Technical Solution 2: Augmented NRE

1. NRE version 3 – Roadmap developed
2. No break in provision of service
3. Rapid delivery time
4. Opportunity to re-engage with users by adding additional tools.

Refresh of current NRE delivered by incumbent

Low-risk strategy to deliver an enhanced NRE, while preparing to specify and procure the NG-NRE

   Ref: NW/Pj/Res Comms/4900 Ver 1.1 Final   18   **See Notes**

The second technical solution looks toward the current incumbent providing NG-NRE as a refresh or replacement of the current system. There are a number of key points that may prove an option for the Cabinet Office:

- Current incumbent are working on NRE version 3. There is a roadmap for this with current incumbent. This is due to implement for another customer by 1st quarter 2013. NRE version 3 is alleged to have improved functionality and an improved front end (GUI) for the customer. The project team have had no sight of the roadmap, design specification or working of NRE version 3.
- There are some very strong drivers for utilising this option. There would be no requirement to move the current security model for this solution. This could greatly decrease the delivery time for implementation.
- There would be little or no break in service with both versions running parallel until customer sign off.
- The information flows that the end user has become accustomed to over the last number of years utilisation would stay current, therefore the user is accustomed to the practices of how to create, manipulate and share information does not fundamentally change (apart from the user interface that would improve the experience)
- Increased functionality can be brought into service including mapping and GIS. There are the existing products from Ultra that had not been procured as part of the existing system.

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- Opportunity to implement a new front end and move away from the clunky interface that is frustrating end users at present.
- Opportunity to upgrade security certificate interface to system that becomes seamless to the end user
- This technical solution does not meet the government ICT strategy and does not move the design onto the PSN; however the PSN, G-Cloud and Cloud store are still at an early stage. The technical solution could be moved onto this model at a later date. This would allow for another government organisation that is not dealing with a mission critical system to be the test bed
- There is a danger that the end user may perceive this as no change to the current ways of working. If managed with a robust communication plan it will allow for the user experience to change and add value to the multi agency community
- This provides a good 1-2 year solution

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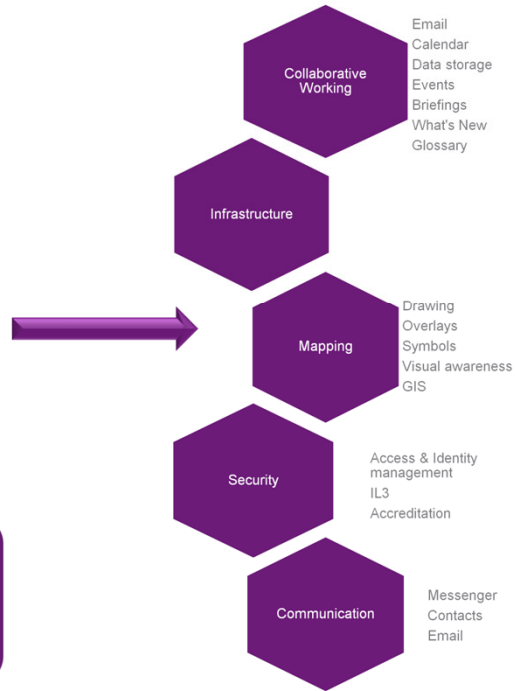
Industry Provided NG-NRE

Strengths
- Updated technology
- Competition from suppliers
- Provide additional functionality
- Improved user interface

Weakness
- No governance
- Risk from introduction of or transition to a new system
- Costs not known at this time (in advance of requirement)
- Credibility of provider if it fails
- Industry concern over potential for reputational damage set against size of project
- Does not move on to PSN
- Time to deliver

Different Providers

Opportunities
- Perception of Cabinet Office ownership and buy in
- Mandate use of NRE nationally
- Solve licensing issues
- Enhance customer experience

Threats
- Data migration issues
- Break in service
- Lack of industry appetite
- May fail
- Integration of different providers
- Length of time to deliver
- Accreditation issues

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Assessment Technical Solution 3: Industry Provided NG-NRE

1. NG-NRE concept delivered through open competition
2. Latest Technology
3. High start-up costs to supplier
4. Short procurement timescale risks break in delivery of service

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Current NRE concept with added functionality; delivered by open competition

Higher-risk strategy allowing new functionality, carries significant risk of cost, delay and shortcomings in performance

   Ref: NW/Pj/Res Comms/4900 Ver 1.1 Final 22 **See Notes**

The third technical solution looks at a break from the current application service provider and looks at the same functionality delivered by open competition by an application service provider. This technical solution would look to host a new solution (set of applications). The following are key points for this type of technical solution:

- The current Atlas Collaborate application would be removed from use and a new application procured from a open competition. The application would be provisioned providing the same functionality as Atlas Collaborate; however this would utilise the latest application sets to bring the current functionality with improved user interface.
- There would be the opportunity for the new application provider to bring added functionality such as maps, GIS and forward planning to integrate a Common Operational Picture at a later date.
- There would be a high element of risk with this technical solution. There would be a requirement of extensive testing to ensure that the latest technologies are compatible with the current infrastructure solution. This level of verification, validation and testing would probably not fit within the timescales advised by the Cabinet Office.
- There would be high start-up costs involved with the provision, prototyping, design, testing and deployment of the new application. This would include higher start-up costs to the supplier
- This is a relatively small project for some of the larger companies, however it is a mission critical system that cannot fail. Therefore the appetite from industry may be limited due to the credibility of the service provider if the system was to fail during a major incident versus the size of the project.

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- This technical solution still does not align with the government ICT strategy and does not see the NG-NRE implemented onto the PSN.
- There is still a requirement for a managed service for the user to receive 1st and 2nd level support during operational working. This issue is increased when working with multiple service providers and will require careful integration.
- There would be a requirement to migrate existing data from the current NRE. This could be a time consuming process if data is not in a common format throughout the NRE. The migration process may have issues with current contract provision.
- This technical solution would require a dedicated project team, new Technical Design Authority and careful change management in order to succeed
- The end user would see this as step change for the NRE which may have dangers as they are only becoming accustomed to the current NRE.
- This solution does not necessarily drive those end users currently not utilising the NRE to change
- Will require a full set of Conops and Conuse creating for the end user to derive their own Standard Operating Procedures from.
- This new system would allow for 3-5 years of life before next major change.

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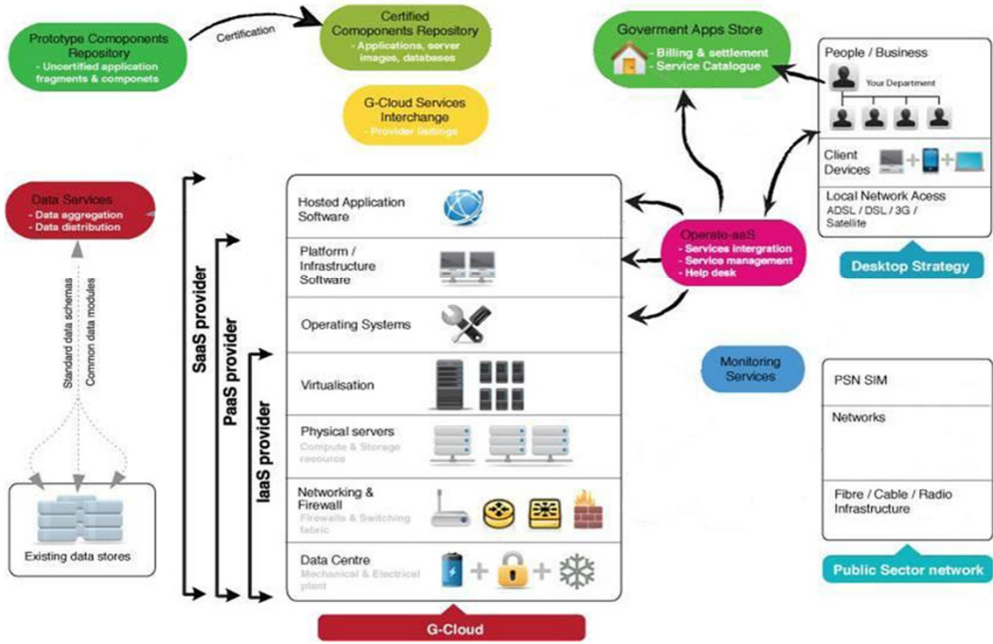
Government Cloud-based Solution

Strengths
- Latest technology
- Follows Government ICT strategy
- Extremely resilient
- Quick to prototype new applications
- Provide additional functionality
- Improve user interface
- Available on any government permitted device
- Governance
- Accreditation

Weakness
- PSN, G-Cloud infancy
- High start-up cost
- Size of project
- Break in provision of service
- Length of time to deliver

PSN-G-Cloud

Opportunities
- Cabinet Office ownership and buy in
- Mandate use of NRE nationally
- Solve licensing issues
- Enhance customer experience
- Improved information security and compliance
- Innovation

Threats
- Data migration issues
- Break in service
- Lack of industry appetite
- Lack of expertise to implement
- Applications transition
- Length of time to deliver
- Technical Design Authority
- Longer term contracts

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Assessment Technical Solution 4: Government Cloud-based Solution

1. NG-NRE concept delivered on Government Cloud
2. Moves to the Government ICT Strategy
3. Latest technology
4. PSN, G-Cloud and Cloudstore infancy
5. Time to deliver all functionality risks break in service

Next Generation NRE following Government ICT Strategy

High risk of failing to achieve the delivery times due to questions over PSN maturity, supplier accreditation, integration of services and infancy of the overall concept

    Ref: NW/Pj/Res Comms/4900 Ver 1.1 Final   26   See Notes

The assessment of technical solution 4 is that of a highly capable solution, however there is a high element of risk in the early days of this type of solution. The salient points are expanded here:

- By following the government ICT strategy for the NG-NRE there are a number of key areas that should allow for the system to grow with time. The services to be provided for the NRE would be hosted utilising the PSN which provides a number of measures that would speed up the procurement process and guarantee delivery of a resilient service for the Cabinet Office (CSS). Some of the areas addressed would be the provision of service management functions such as incident, problem and change management. The end user may have a co-ordinated 1st level support help desk to deal with their day to day business as well as managed escalation of incidents and change requests on their behalf.
- Through open competition of services in the G-Cloud store the NG-NRE would have the opportunity to have the latest technology that has already passed accreditation to be available through the PSN connectivity. This will greatly speed up the procurement and delivery timeframes of future systems.
- Access to the NG-NRE on the PSN allows for resilient connectivity from many different access points and a growing number of devices. This allows for growth in the future as further interoperability become available. At present this only allows for access via government approved networks. This may effect up to 50% of the current end user population. PSN access form the general internet is unclear. C2 responders have this requirement if there is no GSi connectivity.

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- The governments data.gov program brings in applications developers that can rapidly spin up applications to meet the user requirements. This agile process would allow the latest subject matter innovators develop applications for many different scenarios.
- Governance of who can connect and when is managed through the PSN taking the burden away from the end users with a centralised access and identity management system. This type of mechanism is in place for other apps at present.
- All applications and systems delivered from the PSN/G-Cloud are accredited prior to availability to the customer. Availability of products on G-Cloud store may be an issue in early stages
- Data storage within the PSN is scalable allowing for services to be paid for as and when they are needed.
- One of the major risk areas involved with utilising the PSN and G-Cloud at present is the infancy of the project. The project team is unaware of testing to destruction for mission critical systems and resilience, further investigation would be required to inform this area. There is a high risk element of leading the way in utilising the technology for the NG-NRE until it is tested by other government departments. There is a question if this is the type of project (regardless of its size) that should be tested upon delivery of services from the PSN and G-Cloud.
- There is no evidence to comprehend the timescales for delivery of the full system through this delivery mechanism and there is the danger of not delivering within the timescales that the Cabinet Office are requesting.
- This solution is innovative and will greatly enhance the functionality for the end users, however there is no evidence to support that it is achievable at present and may be an option for the longer term.

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Industry Assessment: 1

Technical solutions:
- Technically feasible to provide any of the candidate solutions
- Options 1 and 2 perception of no change
- Options 3 and 4 are the options that industry wishes to deliver

Industry appetite:
- There may be a lack of interest if option 1 or 2 was investigated.
- Some feared that Options 1 and 2 suggested the Cabinet Office was not serious about moving away from the current incumbent.
- Dependent on transfer of risk: NG-NRE will tend to be involved when the stakes are very high. Commercial Ts&Cs, penalties, etc will have a direct effect on industry appetite.
- Similarly, this system carries risk to supplier reputation
- Industry advised that moving to the higher risk technical solutions would require longer contracts: 3-5years

           See Notes

The industry workshop highlighted a number of overarching items that would require clarification and identification before moving forward.

It was agreed that there were a number of technical solutions to deliver the NG-NRE; however before this could be investigated detail would be required on:

1. The exposure of risk to the supplier if the system was to fail on delivery, resilience or poor acceptance from the user community.
2. Who would manage this service. It was deemed that the Cabinet Office were not designed to manage services.
3. Industry hinted that there may be a lack of interest if option 1 or 2 was investigated. It was felt that these options gave the perception that the Cabinet Office were not serious about moving away from the current incumbent. Industry felt that the decision had already been decided.
4. What is the Cabinet Office appetite for risk; this would play a key part in the design of future systems especially when investigating cloud based solutions. It was thought that this technology may be too new for the government to work with for systems up to IL3.
5. Creation of Concept of Operations and Concept of Use.
6. Whatever solutions was decided on clarification would be needed on who the Technical Design Authority would be.

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7. Future functional elements highlighted by industry that would need investigation included the following:
    1. Storage/hosting facilities. Options of G-Cloud or private cloud.
    2. Provision of the communications and network layers.
    3. Applications and toolsets available to the client. Availability within an Apps store (Cloudstore).
    4. What restrictions in place on operating systems and web-browsing technologies (legacy unsupported ie6 may not interface with future systems).
    5. What restrictions would be in place for access devices in the future?
    6. The design of the security model allowing users access from their devices.
    7. The full list of workplace tools to be delivered. COTS v Bespoke for COP, GIS, mapping and collaborative working and their integration into the system.
    8. The through life plan of the system.
    9. Integration of alerting system to included text, mail and smart messaging.
    10. The resilience and disaster recovery concepts such as patch management, security, real-time replication of data

8. Future non-functional elements highlighted by industry that would need investigation included the following:
    1. The provision of service management in the areas of service transition, service operations to include incident, problem and change management and continual service improvement.
    2. Training in the use of the applications and then continual exercising to ensure that users are capable of using the system.
    3. Innovation through horizon scanning for future technologies, research and development. This would enable the NG-NRE to become an continuous evolving systems.
    4. What would the governance model of the NRE look like.

9. Industry advised that moving to the higher risk technical solutions would require longer contracts 3-5years due to design, development and deployment of newer innovative technologies.
10. If the desired model moved away from a single supplier, who would be accountable when incidents occurred
11. Industry highlighted that there may be an opportunity to combine existing IL3 systems on to a single platform. These could include NERMIS, RIMNET and the Health Protection Agency

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Industry Assessment: 2

Requirements: industry also looking for clarification on:
- Storage/hosting facilities: G-Cloud? Private cloud?
- Provision of the communications and network layers.
- Applications and toolsets
- Concept of Operations and Concept of Use
- Service delivery and management
- Training (use of the applications; refresher training)
- operating systems and web-browsers
- Access devices
- Information assurance: security requirements and policy
- Workplace tools
- Through life management strategy
- Integration of alerting system (CAP?)

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Industry Assessment: 3

Contracting models

◥ Clear preference for the "prime integrator" model, over "integrator with infrastructure provided as GFX"

◥ Much less interest in "service management + towers" model

Industry sought clarification on:

◥ Governance: who would manage this service?

◥ Governance: who would be the Technical Design Authority?

◥ What is the Government appetite for risk?

◥ Length of contracts: industry strong preference for longer

◥ Combining existing IL3 services

Wider considerations:

◥ Opportunity to combine existing IL3 systems in single platform: e.g. with NERMIS, RIMNET and the Health Protection Agency

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◥ **Conclusions & Recommendations**

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Conclusions

▼ No clear single technical architecture solution can answer all concerns

▼ Options 1 & 2 provide continuity from incumbent; these reduce the risk in September 2013, but on their own do not offer a longer-term solution

▼ Options 3 & 4 are change options, which imply risk; trying to achieve these in September 2013 carries significant risk

▼ Some in industry feared that short timescales are evidence that Government wishes to stay with current incumbent

▼ Common thread of issues regardless of the technical solution

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- The investigation has found that there is no clear roadmap to procuring a solution. It is perceived that there will be a need to mix a number of the options in order to realise the fully fledged NG-NRE.
- The technical solutions all carry their own elements of risk in order to be successful. These are varied across the board however some of the risks are loss of service, loss of data, user buy-in, high start-up costs and late delivery.
- Industry felt that they would require confidence in the appetite of the Cabinet Office to procure a new system and not stay with the current system before progressing further. Short timescales for requirement provided this fear.
- Nearly all technical solutions may fail to deliver within the Cabinet Office time frames. Gaining industry confidence and design of a roadmap to procurement may go some way to avail this problem.
- Industry highlighted that the relative small size of the project combined with the high availability may have a negative effect on cost. Industry also noted that the lack of take up on licences and the licencing approach would require investigating in order to become a viable solution for industry.
- Regardless of the technical solution there are number of common threads of issues that run through the current and NG-NRE. These include and are not limited to:
    - Definition of user requirements (what the system must do v wish list)
    - Governance model across the architecture of the NRE
    - Concept of Ops and Concept of Use designed for the NRE
    - Accountability
    - No guaranteed usage of replacement system

NiTEWORKS

Recommendations

❰ Scoping study of what the system must do
❰ Design of doctrine & policy (Concept of Operations and Use) for NG-NRE.
❰ Identification of NRE shortcomings v. user complaints
❰ Investigation into hosting IL1 to IL3 services through a single portal.
❰ Early engagement with industry into requirements
❰ Early feasibility study into hosting on PSN & G-Cloud

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