**Environment Monitoring System**

**Recommendation Report**

Maurice Franceschi

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# Background

IS manages a large number of University High Priority services with 24x365 uptime and 99.9% availability expectations. Over the last ten years the number of infrastructure components involved in providing these priority services has grown very significantly and to a level where manual checks are no longer feasible. Additionally, the numbers of lower priority but high value services has grown at an even greater rate over the same period.

Automated monitoring, reporting and alerting of these technological\infrastructural fundamentals and services is key to the delivering of a successful portfolio of business systems to the University. Not having such facilities in place not only considerably diminishes our ability to cohesively manage and grow our services and deliver reliable performant services but also distracts key resources and puts considerable strain on these resources as manual and imperfect monitoring is demanded. This in turn translates into increased levels of risk to services. Furthermore, this persistent and increasing workload prevents resources from progressing with other work that might be of more benefit to the organisation.

Recognising this need, IS undertook a journey to investigate how to improve our environment monitoring and reporting which was started in 2013 and which was led by a highly technical team. The group initially focussed on tools and what benefits they might provide for us across the various areas of the organisation.
The team identified that while we have some very effective products and tools in place already, these tools are chiefly being used by us be smaller groups and at a low level. We generally struggle to provide a coherent and agreed service level or holistic view which can be understood by many different audiences (service owners, technical, end users etc) and that accurately represents the understood status of our services and environments.

To address this the inf107 project was undertaken and within this project a technical panel was formed. This panel was asked to perform an options appraisal on monitoring solutions and to deliver recommendations of how monitoring across IS should be taken forward.

|  |  |
| --- | --- |
| Alan Boyd | ITI Networks |
| Martin Campbell | ITI Unix, Senior Computing Officer. IS Unix Section  |
| Barry Tait | ITI Unix, Senior Computing Officer. . IS Unix Section  |
| Matt Hodson  | ITI Unix, Senior Computing Officer. . IS Unix Section  |
| Fiona Lawson | ITI Architecture, Senior Computing Officer. IS Infrastructure Windows Section |
| Iain Fiddes | IS Applications, Development Technology Manager and Deputy Head of Development Services |
| Stefan Kaempf | IS Applications, Applications Management Manager and Deputy Head of Production Services |
| Heather Larnach | IS Applications, Technology management Manager |

# Executive Summary

This paper recommends a number of measures that should be adopted in order to improve our ability to deliver resilient, performant, properly governed services and infrastructures for the University of Edinburgh. These recommendations have been produced by a group of technical professionals from across IS each representing a stakeholder area and with significant experience in developing and running the systems and services the University operates.

The panel recommends

* SCOM is trialled as a Pilot and a formal process of technical evaluation and acceptance is carried out to ensure that the product is suitable and delivers the desired benefits and outputs.
* The Pilot should also trial Organisational Changes for a chosen number of services. Changes should be based on ITIL best practice and drawn up by the project team potentially using external ITIL expertise.
* Should the Pilot prove to be successful the University goes on to fully adopt the ITIL changes recommended and validated by the pilot and fully deploys the chosen monitoring solution.
* If the SCOM product pilot is unsuccessful, the project team would require to re-evaluate the other incumbent solutions and/or third party products in order to make the required recommendation.
* As part of the Pilot the panel recommends that an ITIL maturity assessment be carried-out at the University and that recommendations from that review be assessed.
* The necessary staff and technical resources should be provided to ensure that both organisational change and the pilot / ultimate technical solution(s) deliver a solution that optimises our delivery of services to the business.

Broadly speaking, the following three options were open to the panel

* Do nothing
* Implement a completely new enterprise solution replacing all existing tools and services
* Build on existing tools and services

The panel evaluated several monitoring solutions ranging from large monitoring packages used in other UK Universities to existing University of Edinburgh monitoring tools (Within individual sections) and concluded that monitoring tools that University of Edinburgh currently use are the preferred solution, which meet the broadest range of requirements.

The panel assessed the options identified and confirms that Microsoft SCOM offers the most comprehensive solution as it meets the broadest range of requirements.

The panel recommends that the Organisational changes are implemented allowing closer adherence to ITIL principles and methods. This adoption would provide the necessary framework from which any technical solution that offered holistic monitoring, management and reporting would be greatly enhanced. This adoption would include the creation of key roles, some of which either do not exist or have been implemented in a ‘silo’ fashion at Edinburgh University in order to shift towards to an ITIL structure.

<http://www.itsmcommunity.org/downloads/ITIL_Role_Descriptions.pdf>

The panel evaluated several monitoring solutions and concluded that Microsoft Systems Center Operations Manager (SCOM) was the preferred solution meeting the broadest range of requirements most effectively and thereby delivering the most value to our business from the solution available.

<http://www.microsoft.com/en-us/server-cloud/products/system-center-2012-r2/>

The panel had to ensure that any solution would be compatible and leverage existing tools where possible, would optimise and connect services and would act as an overarching solution presenting a single point of entry for all consumers.

## Supporting the Recommendations

SCOM is trialled as a Pilot and a formal process of technical evaluation and acceptance is carried out to ensure that the product is suitable and delivers the desired benefits and outputs

The panel initially investigated solutions that would be new to the University of Edinburgh and not already providing a role or partial role. That is, we aimed to discover a product in another institution that would serve as the model for our approach. For example, not that we would purchase (Dell) Foglight, but that we should proceed to procure a product in the price range, and with the functional richness, of Foglight.

During the process of this review it was decided to widen the scope to evaluate incumbent solutions and tools. The outcome of this more extensive review was that two of our existing tools, namely SCOM and Zen Open Source Software (ZenOSS) met requirements better than any of the external solutions the panel researched and indeed SCOM was found to meet requirements across the board and voted best overall solution by a significant margin.

The total costs of ownership (Acquisition + Implementation + Operation) of SCOM and ZenOSS were found to be significantly less than for the other solutions reviewed.

Finally, as we already use these products, we already have relevant skills among our technical staff.

However, our current deployment and usage of these tools does not offer the complete set of benefits and outcomes that the panel is seeking. It is therefore recommended that we adopt the primary candidate (SCOM) and carry out a trial to determine whether it meets the requirements of the initiative. It can also assess the seriousness of reported issues such as browser support, the monitoring capacity and the licensing complexity.

This Pilot would be run as a new project and would involve personnel from all of the teams that comprised the panel for the present project and perhaps also groups and stakeholders who together could best evaluate the effectiveness of the solution in meeting our monitoring and organisational targets. An example would be an existing business partner or service owner who has a requirement for service orientated representation of service health and behaviour within a single, customisable dashboard.

The Pilot should also trial Organisational Changes for a chosen number of services. Changes should be based on ITIL best practice and drawn up by the project team potentially using external ITIL expertise.

On visits to Sheffield Hallam University and especially Imperial College London, the panel came to understand that the chosen product was less important than having the right organisation and processes in place. These institutions have funded and supported the re-structuring and improvement of their IT organisations and created staff roles based on ITIL best practise. They have clear processes and specialised staff with specific responsibilities in the area of Capacity and Availability Management, Service Delivery and Service Support, including Incident, Problem, Change and Release Management.

In particular, in discussions with Imperial they de-emphasised the Foglight product they adopted and put the emphasis on:

1) A properly structured IT organisation was now in place (This delivers improved efficiencies, service stability and performance, regardless of technology)

2) Their chosen product underpinned the organisation and took a service-centric approach to the product selection

They adopted the view that the efficacy of and value add from software products would be severely limited without the supporting organisational structure.

The Panel recommends therefore that in addition to the technical implementation as discussed we also implement the necessary organisational structure and processes alongside the implementation of the technical solution. Failing to make these organisational changes could have negative effects on how well the technical solution could be implemented and operated and therefore how much business value could be derived from it. Inclusion of the organisations changes will significantly enhance the likelihood of positive acceptance testing and a successful trial overall.

There are various other monitoring and management systems and solutions we have at UoE, procured and managed independently.  We could take a holistic perspective on UoE monitoring as a whole.  The Pilot could have in scope

* overlap with other systems
* potential opportunities for consolidation into the pilot system
* if and how the existing solutions might be integrated with the intended pilot solution
* how the pilot solution might integrate with other systems (e.g.generation of UniDesk tickets)
* application of SCOM in monitoring application stacks, such as JAVA

Should the Pilot prove to be successful the University goes on to fully adopt the ITIL changes recommended and validated by the pilot and fully deploys the chosen monitoring solution.

Nothing is certain, so a Pilot is needed to ensure that the chosen product and organisational changes do indeed meet requirements. The Pilot will also be used to ensure that intended organisational changes are specified and well-tested. From the Pilot, we expect to gain the confidence and insight to extend the changes throughout Information Services. The Pilot will involve stakeholder groups to ensure a unified acceptance process and to facilitate further development and deployment.

The Panel has recommend a product and Organisation adjustments that should be piloted. It is possible that although the SCOM product was, by a significant margin, the most technically suitable product with the widest and deepest range of capabilities, the Pilot may conclude that the technology is not suitable. If SCOM proves unsuitable, the Panel would consider the other options (incumbent, third party) available at that time and consider whether an alternate technical solution could be suitable. As a corollary, we expect that the changes to our organisation will be evaluated as beneficial regardless of any shortcomings within SCOM.

As part of the Pilot the panel recommends that an ITIL maturity assessment is carried out at the University and recommendations from that review should be assessed.

The panel advocates an independent assessment of our current maturity vis-a-vis Service Delivery. We believe that this would be most useful if it were led by assessors external to The University of Edinburgh. We envisage that existing in-house ITIL expertise and practitioners could assist with this assessment and contribute to any resultant organisational restructuring. This work should be carried out before the extension or implementation of any new technologies or processes for monitoring and we recommend continual or periodic review of any restructuring as well as any new technologies or processes. Goals and measurements of improvement could be agreed.

Service Support processes have already undergone a similar independent review and their maturity, following subsequent development, has been demonstrated over time.

The necessary staff and technical resources should be provided to ensure that both organisational change and the pilot / ultimate technical solution(s) deliver a solution that optimises our delivery of services to the business.

From the experiences at Sheffield and Imperial, it is clear that the proposed organisational change will demand senior management support and financial backing. This document states that a "Champion" be identified at a senior and influential level. Simply implementing a new monitoring solution without placing it within the context of better ways of working will significantly reduce the derived business benefits. Indeed it is possible that any technical solution might be so diminished in its success that it is hard to distinguish pre- from post-implementation. The pilot project will demand considerable energy, resource, focus and determination to see through to conclusion. It will not be satisfactory to simply add this to an existing team's workload and given the pan-Information Systems nature of our recommendation, several teams will require to be involved.

# Context and Evaluation

## Scope

The project team identified several academic institutions who have similar infrastructure and architecture to The University of Edinburgh and who have implemented solutions that deliver the key benefits identified in our initial requirements capture. These institutions were identified using a recent survey carried out by the UCISA Infrastructure Group in which a number of institutions that have tackled this problem and implemented solutions were named. The project team contacted these institutions and where possible made site visits to understand the deployments and their suitability for our institution.

A solution based on an existing successful implementation at another institution seemed likely to be the most cost-effective and quickest to deliver. The project team were required to make a recommendation based on their evaluations of these visits to other institutions as well as their own experience and research. As it turned out, the incumbent systems within Edinburgh provided the best solution.

There are some tools out there that will approach this capability in a single product but at an extremely high cost. To implement such a tool without having a mature monitoring environment in which to build it is a very risky approach. So the pre-project team early on (after a number of demos and discussions) agreed that for Edinburgh it would be best and important to establish a monitoring environment using mostly existing tools and possibly add-on tools rather than attempting to solve the entire problem at once. This will mean initially retaining the low level operational tools currently in use. This background is important to consider and understand in order to frame the team’s vision of building a new, first-generation centralised monitoring solution.

## Constraints

The following constraints were placed on the project

1. 4 to 6 months was allowed to complete the assessment and comparison of solutions
2. The project team should visit 3 or 4 of the most similar and potentially enlightening institutions
3. Very expensive solutions such as high-end commercial products, likely to cost £200k+ were de-scoped
4. The limited availability of some project personnel, including senior managers was taken into consideration
5. 60 days of IS Applications effort was formally allocated for consumption

## Why we want to do this

Our vision for Edinburgh’s first-generation centralised monitoring solution focuses on our services and the single pane of glass.

We want to improve communication to users at all levels but also between colleagues within IS. There is a strong desire to move towards building a process for everyone that provides the common meeting place for all of our systems where together we can proactively manage change in our environments, proactively monitor our systems, quickly diagnose and resolve potential incidents or problems, assess and brand the impact of downtime of our services .

These are some of the current problems in regard to monitoring and managing services.

* We have no coherent end-to-end view of service health
* Focus is on infrastructure health rather than service health or availability
* We need to spot and prevent issues before they happen (proactive) or at worst spot them at the same time as users spot issues (re-active)
* We use multiple tools to monitor our systems at present whereas we would like to have a single pane of glass to service health
* We need to agree responsibilities within teams and adopt processes that reflect and assist to deliver those responsibilities
* Change and problem management are examples of process that exist to a certain extent but could be significantly improved
* In the absence of a consistent, automated monitoring solution, strain is placed on resources to work manually and this increases risk to services
* Very limited historic and statistical information is available and such information is crucial for proper capacity planning and retrospective utilisation/performance analysis
* Some level of automation and monitoring is in place but this is not consistent in coverage of services or in the type or depth of monitoring carried-out
* Monitoring is not consistent, with the lack of standardised measurements resulting in a lack of health thresholds and RAG warning levels
* Limited capacity to identify and address service degradation

A range of desirable, tangible benefits and improvement were agreed in advance of this project initiation by the project team.  If delivered, these would deliver a much-improved level of service management and technical capability.  All of the deliverables would be serve as testing criteria for any future Pilot.

The most important agreed outcomes were -

* A tool that reflects the health of the infrastructure from a service consumers perspective
* A single tool that can aggregates information from itself and potentially other systems into a single view of the health of our services and their underlying infrastructure
* A “single pane of glass” solution that is configurable to the needs of each user, which is easy to interpret and which provides clear communication regarding service health
* A tool that offers an operator the capability to carry out drill-down activity during fault finding and problem resolution
* A single tool that provides information about historic and current behaviour, thus facilitating capacity planning
* A solution that integrates heterogeneous tools and data to provide powerful management information
* A solution that operates as a master of infrastructure and service fault alerting and which can organise and send alerts to specified audiences
* Operational efficiency and flexibility
* A solution that does not necessitate the removal of better-suited, existing management tools
* A solution that is scalable and which does not itself create significant new technical management or administrative burden
* Breaking down the silos within IS and between IS and rest of the university

In the course of our analysis and evaluation of different approaches, one very important truth has emerged. The human and organisational processes are far more important than the tool or technology used in creating a successful solution for monitoring. These processes take shape differently in different organisations but there are some common facts that we must appreciate as we begin the process to deliver a first-generation solution.

## Solution Appraisals

**Key : 0 does not meet, 1 almost meets, 2 meets, 3 exceeds**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  **Key Evaluation Criteria being looked for in replies to Questions** | EG (Middle Ranking 3P) | ICL - Foglight (High-End 3P) | SheffieldOpsView | Zenoss(Incumbent) | SCOM(Incumbent) | New Relic(Incumbent) |
| High availability of monitoring infrastructure | 1.75 |  1.80 | 1.66 | 2.00 | 2.00 | 2.00 |
| size of infrastructure | 2.00 |  1.70 | 2.00 | 2.80 | 1.90 | 2.00 |
| ongoing running costs - staff time, maintenance, adding services etc | 0.50 |  1.70 | 2.00 | 2.00 | 2.00 | 1.80 |
| trend reporting, historic data, capacity planning | 2.0 |  1.80 | 1.66 | 1.30 | 2.60 | 2.10 |
| equal value monitoring across platforms | 0.5 |  1.40 | 2.16 | 2.10 | 2.00 | 1.80 |
| OS, application, service, storage, network, virtual hosting monitoring | 0.5 |  1.40 | 1.50 | 2.00 | 2.60 | 0.80 |
| quality of vendor support - experience, knowledge, support framework | 1.75 |  1.40 | 1.50 | 1.30 | 2.00 | 2.00 |
| cost (setup/purchase/license/maintenance) | 0.25 |  1.10 | 2.33 | 2.00 | 2.00 | 1.20 |
| Is it possible to display service health? | 2.25 |  2.60 | 2.16 | 1.30 | 2.60 | 1.80 |
| Can different technologies be covered (network, application, server, vm, ...) | 2.00 |  1.30 | 1.83 | 2.10 | 2.40 | 0.50 |
| dashboard and reporting capabilities | 2.00 |  2.00 | 1.50 | 1.80 | 2.60 | 2.00 |
| role and team based access and maintenance possible? | 1.25 |  2.00 | 1.83 | 1.90 | 2.00 | 2.00 |
| Ability to view historic data | 2.00 |  2.00 | 1.66 | 1.90 | 2.20 | 2.00 |
| Score (maximum possible is 39) | 18.75 | 22.20 | 23.79 | 24.50 | **28.90** | 22.0 |
| Percentage | 48% | 57% | 61% | 63% | **74%** | 56% |
| Meets Requirements - Average | 1.44 | 1.5 | 1.83 | 1.88 | **2.22** | 1.69 |

We found that the tools already in use at Edinburgh were the strongest candidates from those reviewed. This is not entirely surprising since our staff selected these tools but there is perhaps a more general point that we can potentially move further and faster when we have familiarity and expertise with a particular product.

SCOM emerged as the top candidate from the scores in the evaluation. The main strengths of this product were that it covered the widest range of technologies in our environment including the network layer which was not represented significantly in any other solution and included an attractive and flexible reporting capability for improving communication.

The weaknesses of this product are the potential limitations in the scalability of the database architecture and the limited potential for full management console access for users on non-windows desktop platforms. The product has an extensive web-accessible interface and allows administrators to create customised dashboards for individual groups of non-administrative users.

These wiki pages have details on the scores and comments and feedback in the products.

[INF107 Product Assessment for EG Innovations](https://www.wiki.ed.ac.uk/display/insite/INF107%2BProduct%2BAssessment%2Bfor%2BEG%2BInnovations)

[INF107 Product Assessment for ICL](https://www.wiki.ed.ac.uk/display/insite/INF107%2BProduct%2BAssessment%2Bfor%2BICL)

[INF107 Product Assessment for New Relic](https://www.wiki.ed.ac.uk/display/insite/INF107%2BProduct%2BAssessment%2Bfor%2BNew%2BRelic)

[INF107 Product Assessment for SCOM](https://www.wiki.ed.ac.uk/display/insite/INF107%2BProduct%2BAssessment%2Bfor%2BSCOM)

[INF107 Product Assessment for Sheffield Hallam](https://www.wiki.ed.ac.uk/display/insite/INF107%2BProduct%2BAssessment%2Bfor%2BSheffield%2BHallam)

[INF107 Product Assessment for ZenOSS](https://www.wiki.ed.ac.uk/display/insite/INF107%2BProduct%2BAssessment%2Bfor%2BZenOSS)

## TCO

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **EG(Middle Ranking 3P)** | **Foglight(High-End 3rd Party)** | **Sheffield (OpsView)** | **Zenoss(Incumbent)** | **SCOM(Incumbent)** | **New Relic(Incumbent)** |
| ProcurementAssume a small-medium project, OJEU, Restricted | £9 months |  £9 months | £9 months | n/a | n/a | n/a |
| Bespoke BuildApps / ITI development to develop bespoke code  | £3 months |  £3 months |  ££6-12 months | £3 months | £3 months | £3 months |
| ImplementationApps / ITI development to set up servers, configure system, test | ££3 months |  ££3 months |  ££6-12 months | £3 months | £3 months | £3 months |
| Hardware Costsover five years | £ | £ | £ | £ | £ | £ |
| Licensesover five years\*assume 500-750 devices being monitored |  ££ | £££ |  ££ | £ | £ | £££ |
| IntegrationsApps / ITI development to integrate with local systemsassume £275 a day | £3 months | £3 months | £3 months | £3 months | £3 months | £3 months |
| Maintenance and SupportApps / ITI supportassume £275 a day | £ | £ | £ | £ | £ | £ |
| Redesign of Organisation | ££ | ££ | ££ | ££ | ££ | ££ |
| Total cost over 5 Years | £££££££££££18 months | ££££££££££££18 months | ££££££££££££18 months | ££££££££9 months | ££££££££9 months | £££££££££9 months |

# Conclusions and Recommendations

## Vision

***Our future vision should always be ambitious and inspire us on the journey towards our ultimate goal even if we are unable to realise it immediately. What has been true since the beginning of the journey thus far is that there is a strong desire from all sides of IS to make our situation better.***

The vision ideal is a solution that would allow us to monitor and manage all aspects of our environment from the network to the client, reporting to us any errors or emerging problems that we can proactively manage as they happen, and providing us with graphs and statistics that we can share with our managers and end-users.

The vision for the first-generation monitoring solution for Edinburgh is about a process where we proactively monitor our environment through the single pane of glass for potential incidents or problems arising and manage change in the environment through an agreed and centralised common process.

Proactive monitoring and tuning of the environment should gradually become the norm for support staff as firefighting reduces over time after the implementation of the monitoring solution. Performance, capacity, and stability all being a major focus.

The common services monitoring tool will provide data and alerts on the status of all monitored systems via dashboards customised by user type and role. The monitoring tool will also provide reports available publicly on the website for end user communication on the status of services.

A Service Availability Manager will provide an additional layer of co-ordination for incidents arising outside the normal change process with a particular role in cross-system or common infrastructure events (virtual hosting environment, SAN, storage, network, etc.). The Service Availability Manager will also ensure any required actions are fed back into the change process to prevent recurrence.

A centralised change management process will mean that any changes to the environment will be submitted to a single CAB that will consist primarily of IS staff with both technical, user support, and management responsibilities. Members of the CAB will be responsible for liaison with the end user communities on any issues affecting their services directly.

Each end user community will have a designated IS representative on the CAB. An emergency process will be implemented for any changes that arise between meetings or emergency CAB meetings can be convened for urgent issues with relevant staff. This is not unlike our current process for the pre-matriculation period but is normalised to become common practice in lieu of the system-by-system CABs in place at the moment. The centralised CAB would look at change across the environment and determine the scale and pace of change that can be tolerated across the organisation as a whole.

In order to achieve a stable, performant environment for our users, we must begin to work together to manage our environment as a whole. Working towards end-to-end monitoring and using a single pane of glass to bring a common and agreed view to all. The journey to reach a mature environment based on our discussions with others can take as much as 8-10 years. We are hoping to have learned the lessons from others about their journeys on this path so that we might avoid some of the pitfalls that they have encountered.

This is the theme for our vision – holistic. The first steps on this journey are about bringing together all the teams at Edinburgh and finding a way that we can work more closely together to deliver a coherent and reliable service. We are clear that the focus cannot be just on a piece of software, we must embrace the full process and work more closely together and leave behind the prison of our current silo approach.

## Path

**Evaluating Tools & Technology**

The reality is that management commitment, dedicated staff, and the ITIL enhancements alone would likely represent a great improvement for Edinburgh in creating stability and improved system availability without the addition of a monitoring tool. However, as we want to be able to also improve our communication, a tool will help us to bring information together and facilitate communication for a geographically disparate support staff.

The tools that the project team reviewed are outlined in detail in the discussion section of this report. The key points we want to get across about the tool is that our scores are based on the best range of functionality. One tool might suit one environment better and so represent better value for money. This same tool could be implemented into a different environment and be a complete waste of money and time. The evaluations are impressions of the range of functionality overall.

To implement such a tool without having a mature monitoring environment in which to build has the potential to be a very costly, disruptive service degrading approach.

The other key point is the project focus on strengthening our communication and understanding of services. Some products do this better than others and some do this part well but don’t provide a wide enough range of functionality overall to gain a good score.

The path to move to full scale monitoring across IS covering all the infrastructure we manage and ensuring adequate staffing levels and organisational structures cannot be achieved quickly. A staged approach with regular reviews is proposed. The path follows the following three stages.

**Summary**

### Short term

* Implement a monitoring pilot
* Review and if possible implement organisational changes within IS

This stage is mainly to gather more information and gain experience on monitoring as well as to understand organisational structure and processes better.

### Medium term

* Review outcome from pilot and agree if pilot can become the monitoring tool we use
* Review organisational changes suggested and agree that we can implement organisational changes

This stage is a review stage. If the pilot is not successful further reviews may be required.

### Long term

* Rollout monitoring and organisational changes

**Detail**

### Short term

Based on the recommendations we will implement a monitoring pilot using SCOM. We will:

* Select three priority services for the monitoring
* Ensure the pilot covers different infrastructure technologies such as:
* Operating systems: Linux and Windows
* Databases: Oracle, SQL Server and MySQL
* Physical and virtual machines
* Network and or switches
* SAN and Storage

 The focus is on service status, representing where possible user experience

The project will consult with Microsoft, building on their previous engagement and using their experience of other installations.

The SCOM system is likely to be on a separate environment from the existing SCOM in use.

We also need to ensure that the pilot covers organisational changes recommended in this report. The pilot will not be able to introduce full organisational changes, but should cover the following:

* One team who is responsible for setting up the pilot, covering the following teams: ITI Unix, ITI Architecture and IS Applications
* Review processes and organisational changes such as:
* A change manager and an availability manager for the services using the pilot
* Define processes around the monitoring setup including daily tasks, issue investigation and escalations
* Performing an external review how IS implements Change Management
* The key roles of Change manager and Capacity Manager will be trialled, with a selected number of services.

We can anticipate a medium to large size of project to cover these two work packages.

### Medium term

We will review the pilot and agree what the next steps are. If the pilot is successful we will roll out the pilot and make it the new monitoring tool. If the pilot was not successful we will either:

* choose another monitoring tool as a pilot
* start a new review of monitoring tools

Based on the organisational changes we implemented in the pilot and the experiences on staff and processes during the pilot as well as the external change management review we will have to agree if further changes are required.

### Long Term

Rollout IS wide monitoring tool with adequate organisational process and teams in place to keep the monitoring operational working.

## Changes

### People

**The Champion**

The first fact is that in order to implement a successful monitoring solution, there must be a sponsor at a very senior level in the organisation who is committed to bringing the common monitoring solution to fruition.

The requirement to bring together teams under different management structures makes this a mandatory for any hope of coming out with something that is both viable and widely adopted across the organisation. This was a striking common feature of the successful sites we visited: each had a champion that made it happen despite the obstacles.

### ITIL Implementation Enhancements

Another fact that is common to successful monitoring solutions is an adherence to a centralised IT-led process for managing change and availability in the entire environment. This manifests differently in different institutions but in the case of Edinburgh, ITIL provides the most obvious framework and process for managing change and availability in our environment.

The implementation of the ITIL framework at Edinburgh would need to be refined and enhanced to maximise the potential benefits of its use and to support a more centralised management of our environment.

**A single CAB** (Change Advisory Board) for all University IT systems and a dedicated Change Manager are the minimum requirement but with the additional strong potential for a **Service Availability Manager** to enhance the support offering. Change should be managed primarily via Change&Release and project delivery processes and the introduction of change into the environment co-ordinated by the **Change Manager**.

(CABs involve a bi-weekly change (for example) and conference call involving change management team and representatives of technical support and technical project teams.  Those representatives as well as change managers usually consult business or business analysts before the call and arrive prepared with outage window which is reflected in the change record or ticket.  The change manager(s) enforces the rulebook and has ultimate power over what changes are approved.  Additionally, (walk-up or \_daily ECABs) with senior approval can support Emergency changes.

Additionally, incidents arising on systems under the support area will create a requirement for co-ordination of efforts beyond the normal change management process and this is where the Service Availability Manager can provide value in the process particularly for a large and complex environment.

(There are typically 3 types of change with unique lead times in ITIL - Emergency, Standard, Normal.
More info is available at
<https://www.ucisa.ac.uk/~/media/Files/members/activities/ITIL/servicetransition/chanage_management/ITIL_a%20guide%20to%20change%20management%20pdf.ashx> page 3.
Sometimes normal changes are exempt from change control and/or CAB review.)

A matrix of potential improvements relating to monitoring based on ITIL v3 will help to understand the overall context of the organisational changes being sought.

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| **ITIL v3 Service Management Matrix - University of Edinburgh**  |
| **Volume** | **Process** | **Suggestion** |  |  |
| Transition | Asset / Config | Adopt comprehensive CMDB to help ensure all systems & applications are categorised by tier and monitored |  |  |
| Operations | Incident | Increased integration including change & problem management facilitating adoption of ITIL best practiseCarefully increased automated ticketing via Unidesk API or similar again encouraging ITIL compliance |  |  |
| Problem  | Management of problems by dedicated F/T problem mgr/s to give focus & structure to fixing complex issues |  |  |
| Event  | Service notifications via SMS using cell phones – more obvious than email and will facilitate OOH cover |  |  |
| Service desk / IT Ops | Add devices, traffic light monitoring & perhaps simple break/fix by L1 to free-up L2/3 resources |  |  |

##

\*\*\* end of the report \*\*\*