Improving Day 2 Management of Critical Infrastructure

David Cuthbertson
Square Mile Systems / AssetGen
My Background

Personal Experience
- Network Troubleshooting
- Cabling and Network Installations
- Managed Services Voice/Data

Industry Groups and Frameworks
- BCS
- Bicsi
- ITIL
- ANSI
- TIA
- COBIT
- AFCEA

Process Skills
- Methods
- Communication

Naming
- Labelling
- Change Process

Baselining
- Toolset Development
- Visio automation

LinkedIn
Group Manager
Data Center Engineering
Data Center Operations Management
Improving Day 2 Management Of Critical Infrastructure

Day 1
We use the best components and installation practices we can afford
Everything works as planned and hand it over – finished!
Contractors leave site and everybody moves on to the next project
Current Projects

• Baseline the physical infrastructure of 85 data halls with 6500 racks for change provisioning and capacity management. Help improve ongoing management processes so documentation is maintained daily.
  • Floor plans, rack layouts, inventory, patching

• Map applications, supporting physical/virtual servers and data flows to enable auditors to verify compliance with credit card security rules (PCI-DSS) as well as environment / change management.

• Identify which physical and logical infrastructure is shared by a banking division which has been sold to a competitor.

• Establish an accurate picture of the current infrastructure (5 DCs and 2000 campus locations) so they can be upgraded/transformed/refreshed across by various suppliers over 3 years. Develop operational data needs / processes.
Critical Infrastructure Is Everywhere...

Not the best starting point to identify a connectivity problem with air traffic control!
Why Is Managing Critical Infrastructure Difficult?

• It is often not seen as important as delivering projects, so budget for improving management practices is often minimal.

• It is difficult in practice
  • Many teams and people involved in changes, some cultural issues
  • Adapt change processes that work across multiple teams
  • Lots of spreadsheets, configurations, dependencies to understand
  • Very detailed and prone to error

• Inconsistencies and multiple technologies make it complex

• Very costly to sort out once control and trust is lost

• And when things go wrong – it’s always a management problem!
Simple Task – Complex Planning

We need to move 5 servers to another row of cabinets
Shared Infrastructure Isn’t Simple

Many 1,000s of documents are created by projects, operations and risk processes.
One Technology - Different Methods

A

B

Easy to fault find?
Manage capacity?
Make changes without risk?
Easiest to plan?
Write work instructions?
Predict time taken?
Defining Infrastructure Management Maturity

1. Ad Hoc
   - Informal
   - Individual

2. Repeatable
   - Team based Roles and tasks

3. Defined
   - Documented
   - Consistent

4. Managed
   - Checked
   - Predictable

5. Optimised
   - External checks
   - Benchmarked
Management Maturity Communication

Which team/function presents the most risk because of lack of management control / methods?

In practice it is more complicated - multiple teams, locations, partners
Critical Infrastructure Is Everywhere...

The ongoing delivery of information management depends directly on how it is managed operationally

How change is controlled

How incidents are managed

How the “IT team” understands, communicates and mitigates risks

Plus all the usual management jobs...
Some Of The Usual IT Management Jobs...

1. Managing changes and complexity - new and legacy systems
2. Managing production / test / recovery / development environments
3. Identifying root causes of faults and performance
4. Control of access to data and flows to avoid bandwidth / security issues
5. Migration / transition planning
6. Cost management – contract, server and equipment lifecycle
7. Managing changes in staff, vendors and support partners
8. Application development and software dependencies
9. Best use of internal staff / contractors / 3rd parties
10. Licensing management
11. Backups / recovery / continuity planning
12. Proof of management control – ITIL, CoBit, 27001, PCI DSS, NIST, etc.
Improving Day 2 Management

1. Improve clarity of roles, authority and practices so change is controlled.
   - Aim to improve control by centralised planning and management

2. Minimise the need to duplicate information from project activities into operational support systems
   - Naming conventions and data formats
   - Use common systems – workflow, infrastructure databases
   - Expect to have to create a baseline at some stage

3. Identify and communicate the benefits – cost, time, staff rotation, incident management, cybersecurity, etc.
Common Challenges

- **Time**: plan, implement, communicate
- **Cost**: project delivery, resolving current issues
- **People**: skills, local knowledge, priorities
- **Risk**: project delivery, disruption, mitigation
- **Process**: change approval, handover docs
- **Data**: inconsistent information sets
- **Technical**: physical, virtualise, redesign
- **Contract**: SLAs, penalties, legal
- **Conflicts**: other projects, “redirection by customer”

It may take 2 minutes to add a patch cable, but 2 weeks to plan it.
You can create a virtual server in minutes, but months to get it signed off.
To Make Complexity Easy To Understand – We Simplify
A Connectivity Request

Please connect the router to the switch

Easy to Understand?

1 or 01 or 001?
2/1  2\1  2/01  SL2/1  Port 2/1  Gig 2/1  Fe2/1  Slot 2/09
Mgmt  MGT  Con  Console  ILO  Net  Mgmt
NIC 1  Eth A  Net 0  hba0  bge1  12F1  primary
The Physical Build To Meet The Request
Adopt Integrated Systems and Workflow

1. Reduce effort, time and risk making changes

2. Increase control and ability to respond

- Projects
- Servers
- Networks
- Security
- Service desk

- Request Form
- Outline Design
- Assess Allocate

- Infrastructure Planning
- Project Build Documents
- Local staff Contractors

Previous project documents
Master documents
Capacity plans
Adopt Integrated Systems and Workflow

1. Reduce effort, time and risk making changes
2. Increase control and ability to respond
Optimising Change Processes

Projects

- Request
  - Std Components
    - Design Review
      - Yes
        - Outline Design Doc
          - QA Check
            - Deployment design
              - Accept/Reject
                - Accept
                  - Release
                    - Detailed Plan
                      - Schedule Change
                        - Confirm Contractors
              - Reject
        - No
          - Forward booking
            - Capacity Plan
              - Book Contractor
                - Allocated dates
                - Change from reserved to allocated

Design Team

Deployment Planning

Build Team

Change Mgmt

Legend:

- Yes
- No
- Accept
- Reject
- Forward booking
- Capacity Plan
- Book Contractor
What Should Be **RED, AMBER or GREEN**?

- The CCTV screens have gone blank
- I need to install my 20 new servers
- We have to rollback yesterdays s/w update as it seems to crashing users PCs
- We’re pulling out the old CAT 3 cable
- This update will disable anti-virus s/w
- We are updating the payroll system
- We are doing a DC generator test
- Need to change the firewall rules
- Urgent, bug fix for yesterdays website crash
- My mobile calendar hasn’t been updated
- My PC is going slow or has it stopped?
- I can’t access the server
- "What?
- "Should"
- "Be"
- **RED, AMBER or GREEN?"**
### Why Change – Write It Down!

<table>
<thead>
<tr>
<th>WHY</th>
<th>HOW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost reduction</td>
<td>Defined roles and interfaces</td>
</tr>
<tr>
<td>Shorten project delivery timescales</td>
<td>Standardised naming conventions</td>
</tr>
<tr>
<td>Support operational troubleshooting</td>
<td>Baseline audit and resolve non-conformities</td>
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<tr>
<td>Flexible use of 3rd parties for local build / support</td>
<td>Reduce the number spreadsheets / diagrams using database systems</td>
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<tr>
<td>Ensure controls are applied globally - consistently</td>
<td>Evolving with new technologies</td>
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</tbody>
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   - Expect to have to create a baseline

3. Identify the benefits – cost, time, staff rotation, incident management, cybersecurity, capacity, risk assessment, less data breaches

   Or...

   Wait until the next disaster
Thank You

See us on the exhibit stand or visit our web sites

www.assetgen.com
AssetGen System
Infrastructure database with Visio automation

www.squaremileystems.com
Documentation methods and audits
Visio automation training
Visio utilities, etc