

BEYOND 24×7

High Availability in Higher Education

John Ireland
Systems Development and Support Section Manager
Oxford University Computing Services

Monday Morning...

Hey Joe, we've just bought a new accounts package and need you to install it on the server tomorrow.

Of course – we checked against that server spec you gave us last month. The only thing that's new is that we really need this to be 100% available, especially after all the trouble with the old package.

Well, the accounts office is critical to the business and our workload is huge – we need a 24x7 system that we can rely on.



Darn it Bob, you could have given me a bit more notice. Does it even run on the system we've got?



What do you mean – 100% available?

Hmm, but I bet you haven't set aside a 24x7 sized budget for all this...

Scope of Availability Concerns

Strategy	Design	Transition	Operation	CSI
Strategy Generation	Capacity Mgmt	Change Mgmt	Event Mgmt	Service Monitoring
Financial Mgmt	Service Catalog Mgmt	Asset and Config'n Mgmt	Incident Mgmt	Service Reporting
Demand Mgmt	Availability Mgmt	Release and Deployment Mgmt	Problem Mgmt	Service Improvement
Service Portfolio Mgmt	IT Service Continuity Mgmt	Knowledge Transfer	Service Request Fulfilment	
	Information Security Mgmt	Service Validation And Testing	Access Mgmt	
	Service Level Mgmt	Evaluation		
	Supplier Mgmt	Transition Planning and Support		

Availability Defined

Availability

Ability of a component or service to perform its agreed function when required.

Often calculated as a percentage based on *agreed service time* and downtime. It is best practice to calculate availability using *measurements of the business output* of the service.

Reliability

Ability of a system to operate correctly without interruption (MTBF).

Maintainability

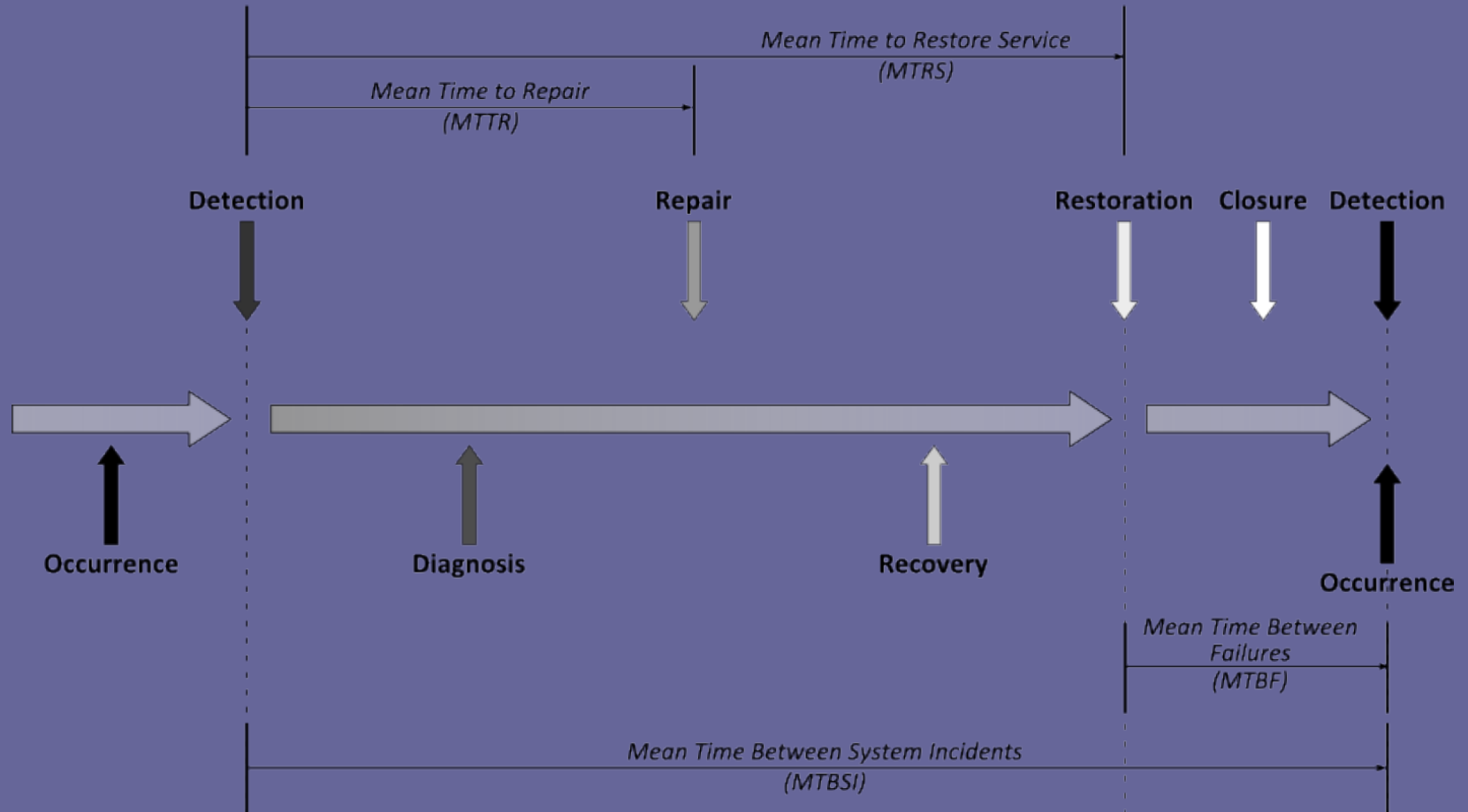
A measure of how quickly and effectively a component or service can be restored to normal working after a failure.

Maintainability is often measured and reported as MTRS.

Serviceability

The ability of a third party service supplier to meet their contractual obligations for availability, maintainability, and reliability.

Expanded Incident Lifecycle



Quantifying Availability

Availability

$$= \text{UPTIME} / \text{AST}$$

$$= 1 - \text{DT} / \text{AST}$$

$$= 1 - \text{MTRS} / \text{MTBSI}$$

$$= \text{MTBF} / \text{MTBSI}$$

- So availability will be increased by:
 - Decreasing MTRS – faster recovery
 - Increasing MTBF – fewer incidents

AST = Agreed Service Time

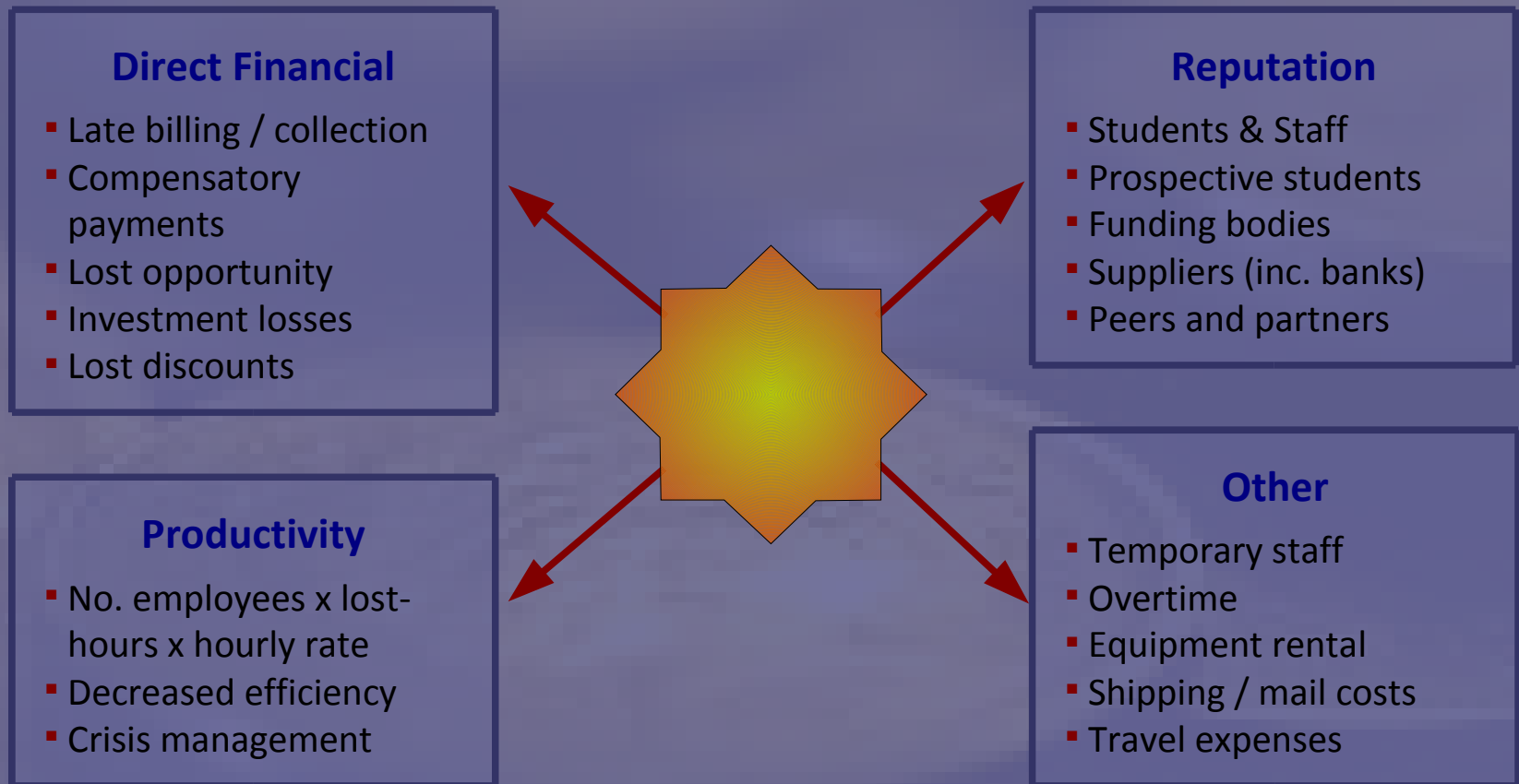
DT = Downtime

MTRS = Mean Time to Restore Service

MTBF = Mean Time Between Failure

MTBSI = Mean Time Between System Incidents

The Cost of Downtime



Common Causes of Service Outage

■ Planned

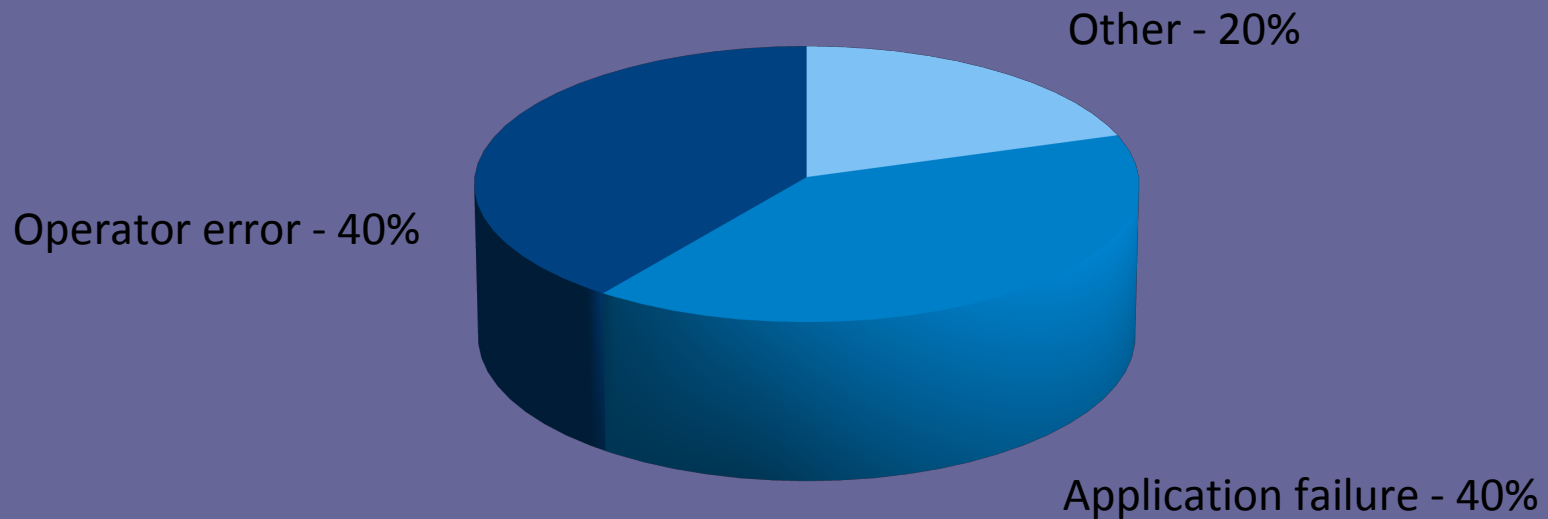
- Hardware / Software upgrade;
- Maintenance;
- Reconfiguration;
- Relocation;
- Environment;
- Backups

■ Unplanned

- Component* failure;
- Operations error;
- Ineffective processes;
- Natural disaster;
- Attack (DoS, virus);
- User error

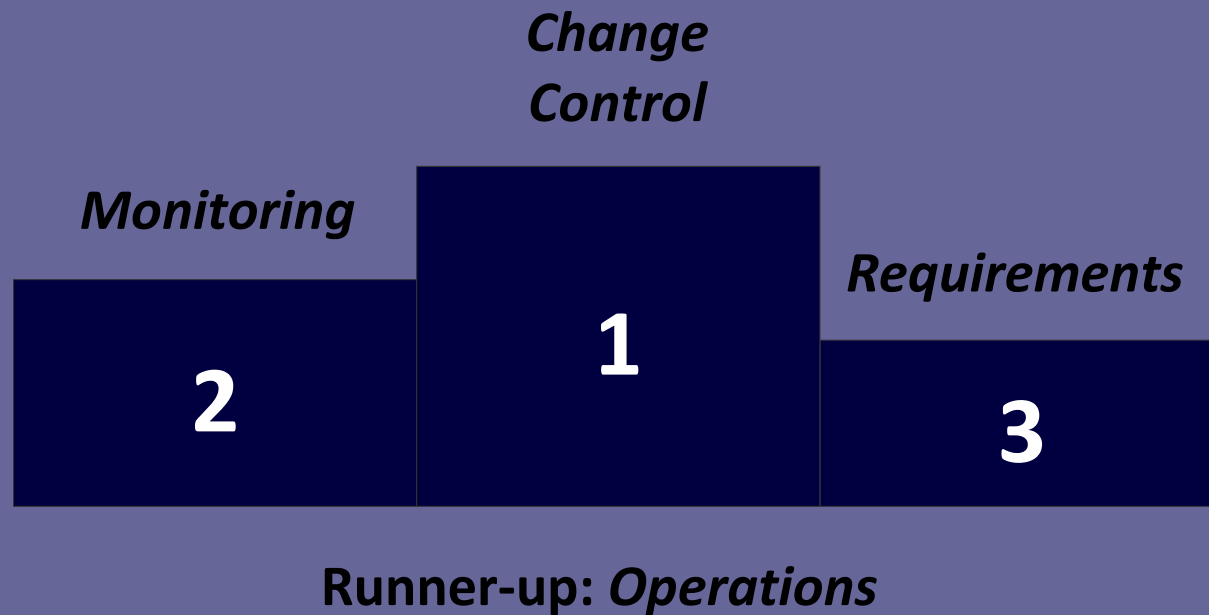
* Component can be any part of a system including Hardware, OS, and Application Software

Analysing the Causes



Source: Gartner ,TG-07-4033 (D Scott), 1999

What would improve availability?



Source: *Availability of enterprise IT systems – an expert-based Bayesian model (Franke, Johnson, König, Marcks von Würtemberg): WSQM 2010*

Three Steps to Availability Heaven

1

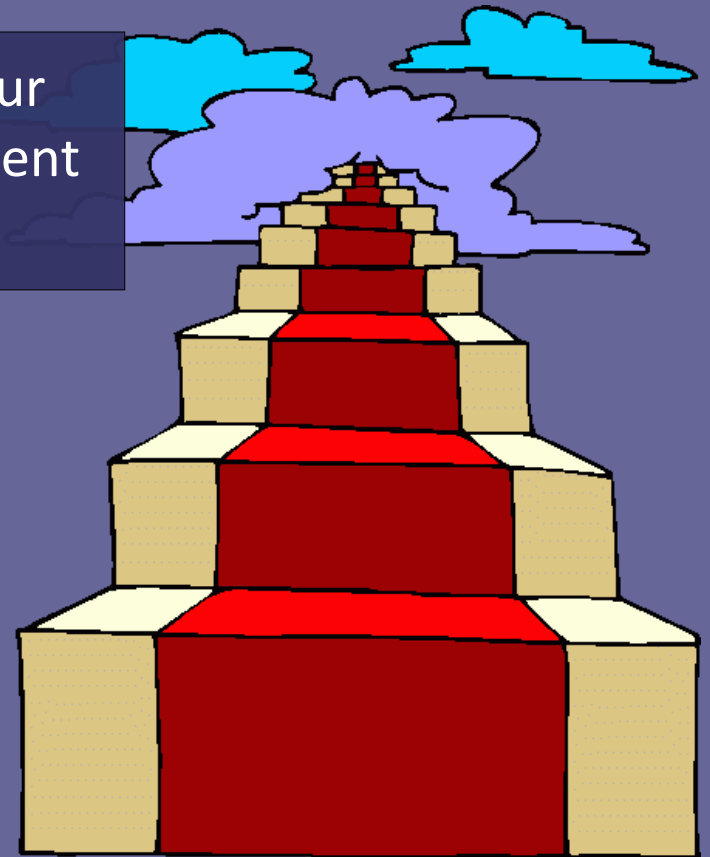
Understand
and negotiate
requirements

2

Select a
technical
solution

3

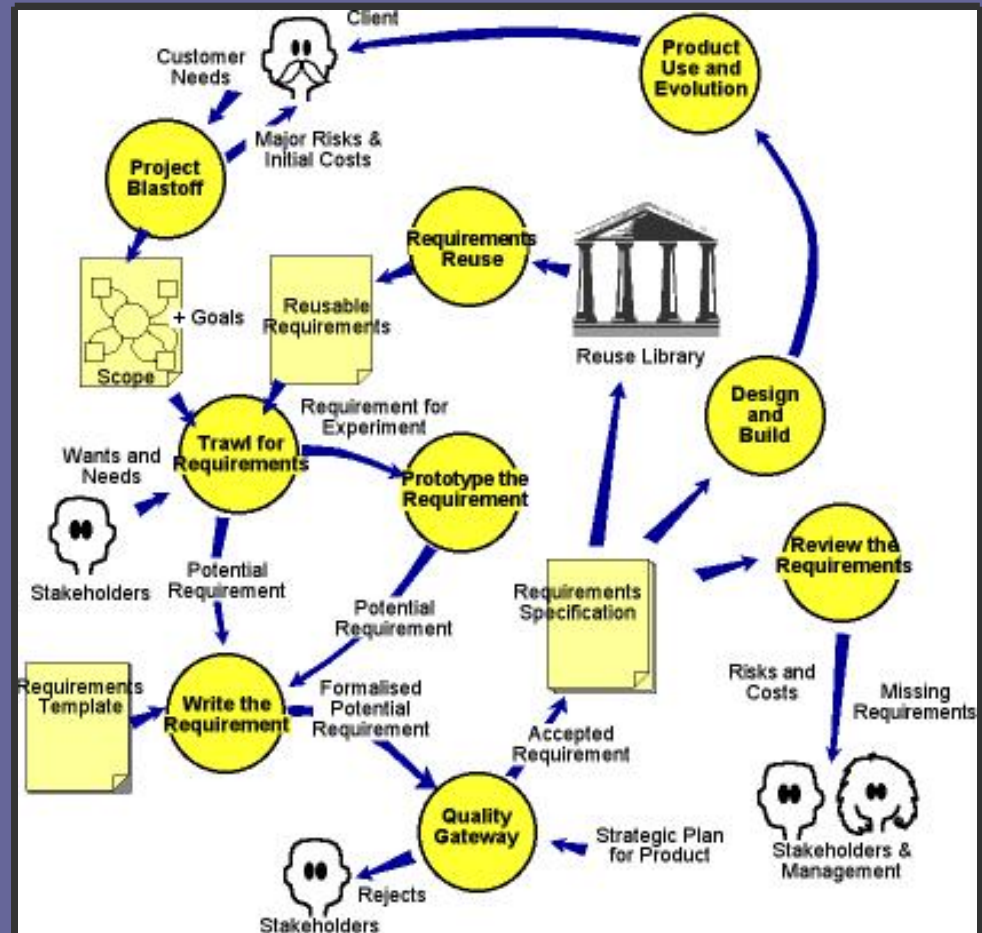
Design your
management
solution



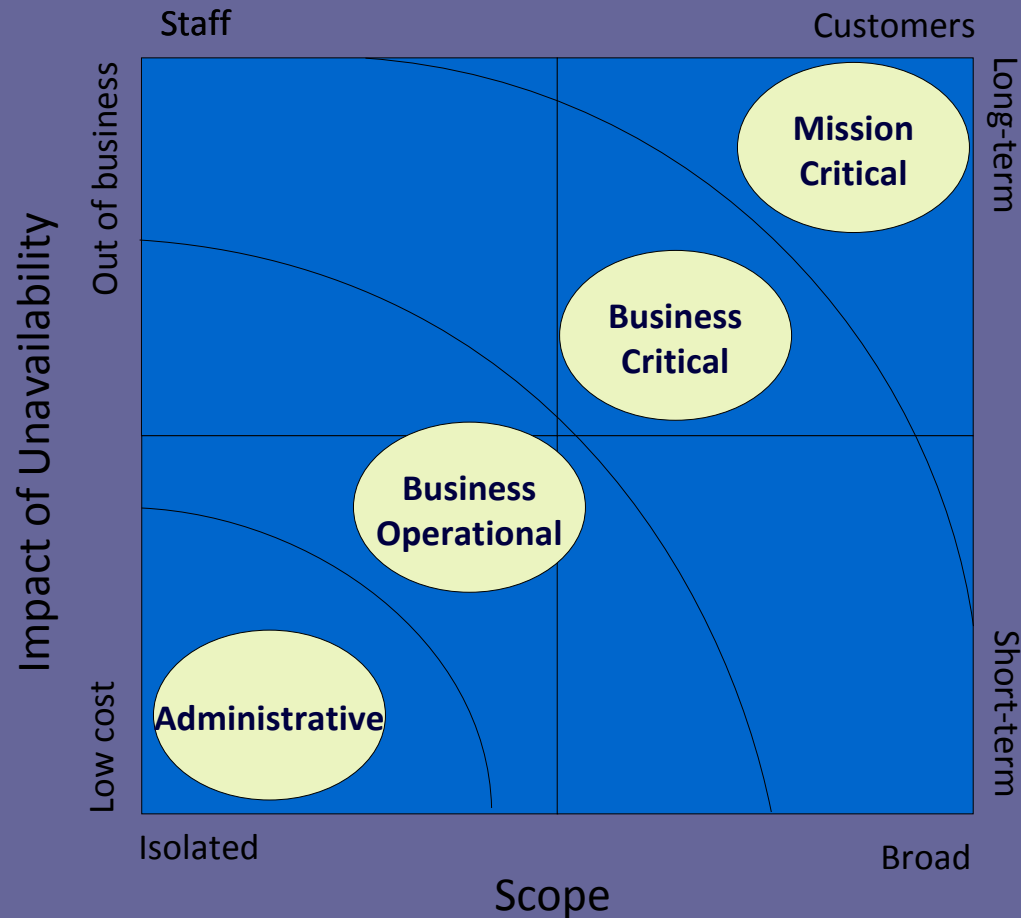
Step 1
Understand and Negotiate Requirements

Negotiating Requirements

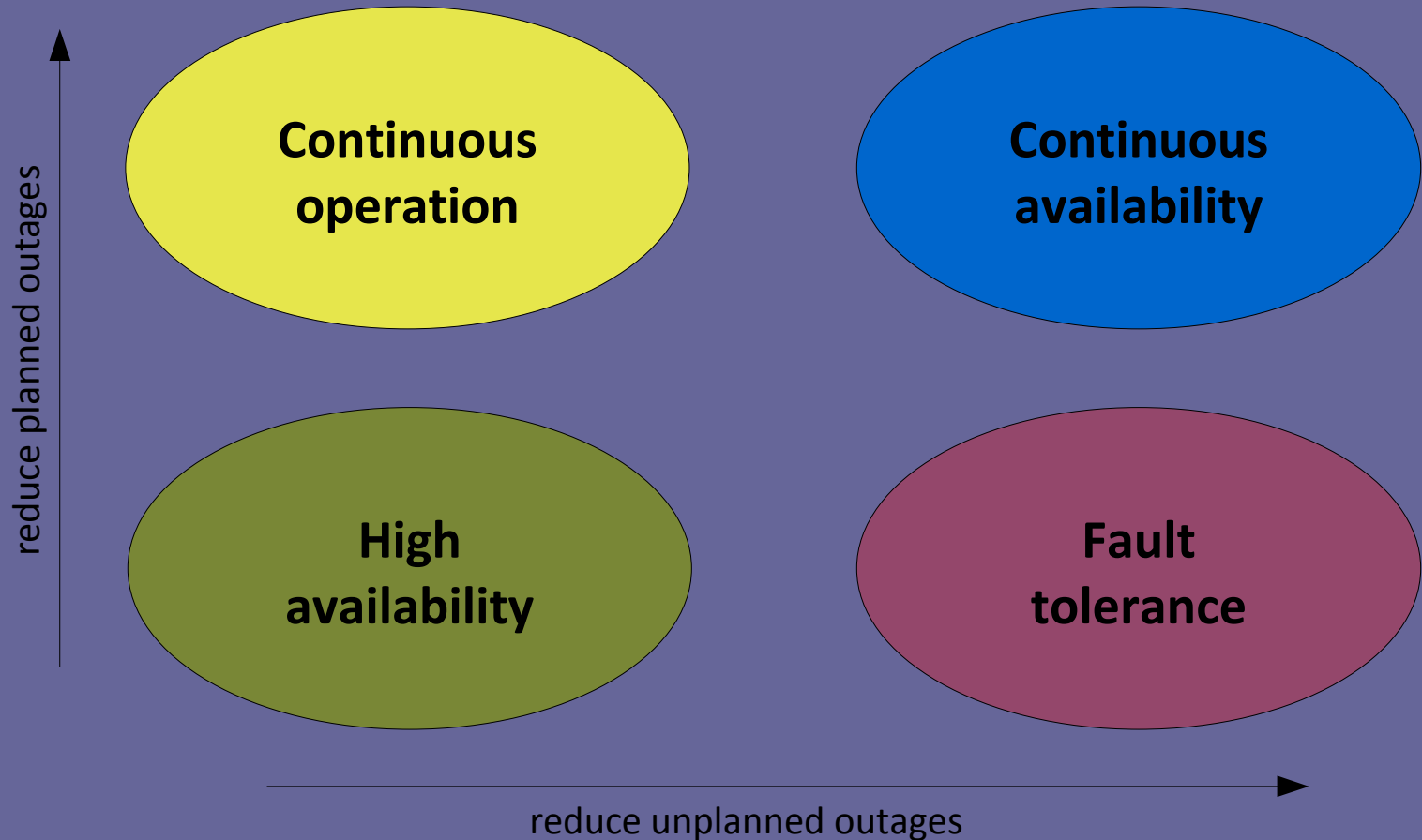
- Probably iterative
- Based on customer needs
- IT provides “domain knowledge”
- Could start with use cases / scenario



Types of Business Application



Availability Offerings

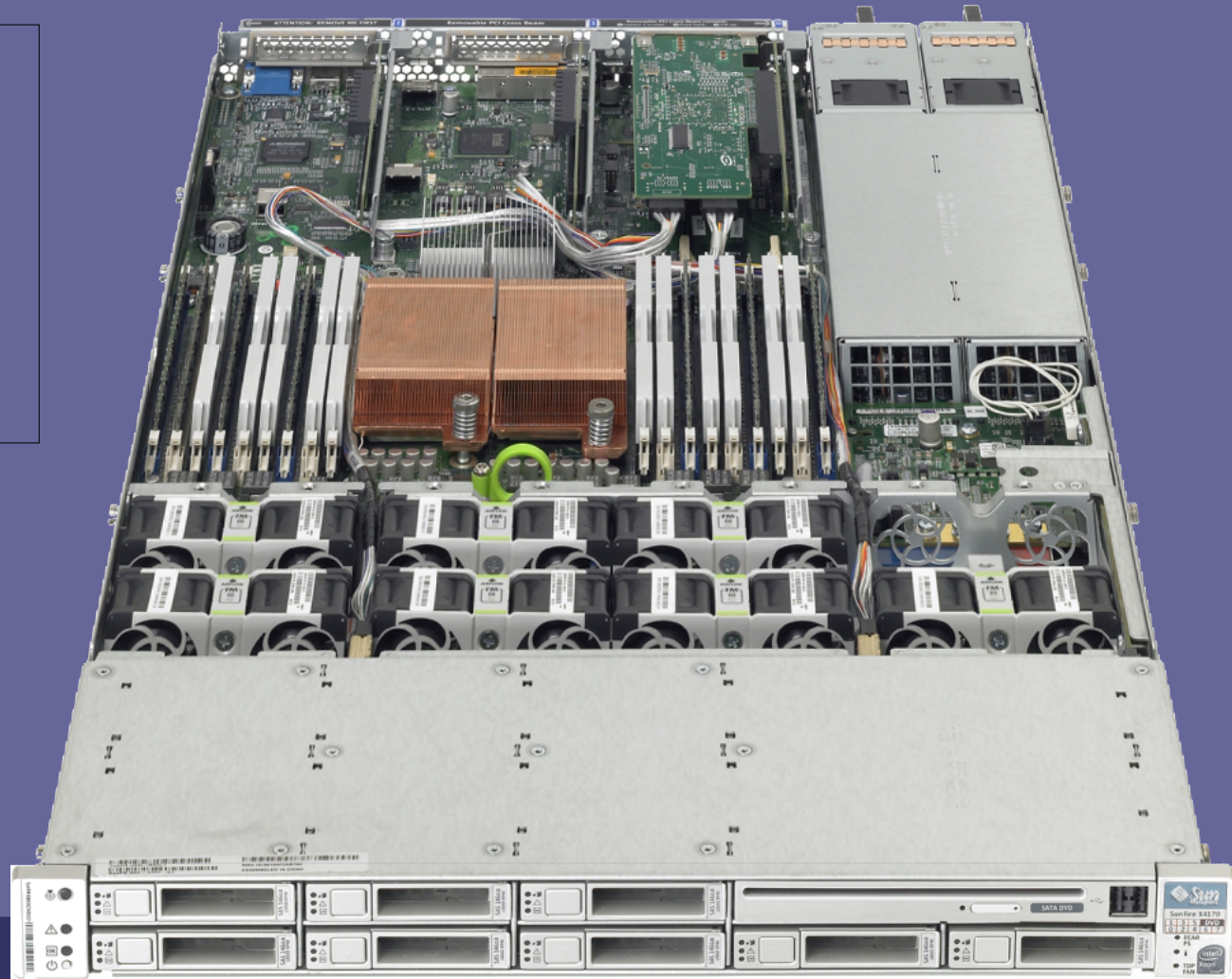


Step 2
Select a Technical Solution

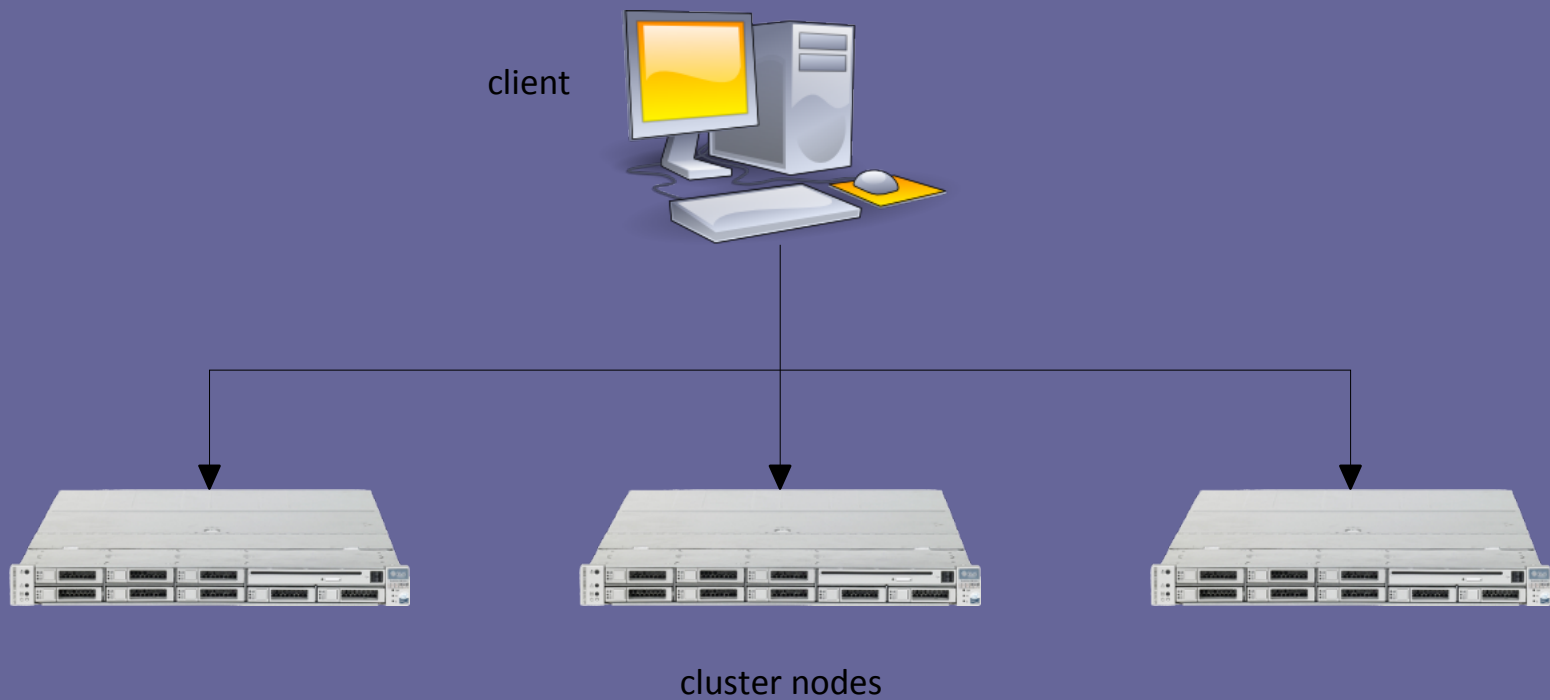
Fault Tolerance

Resilience

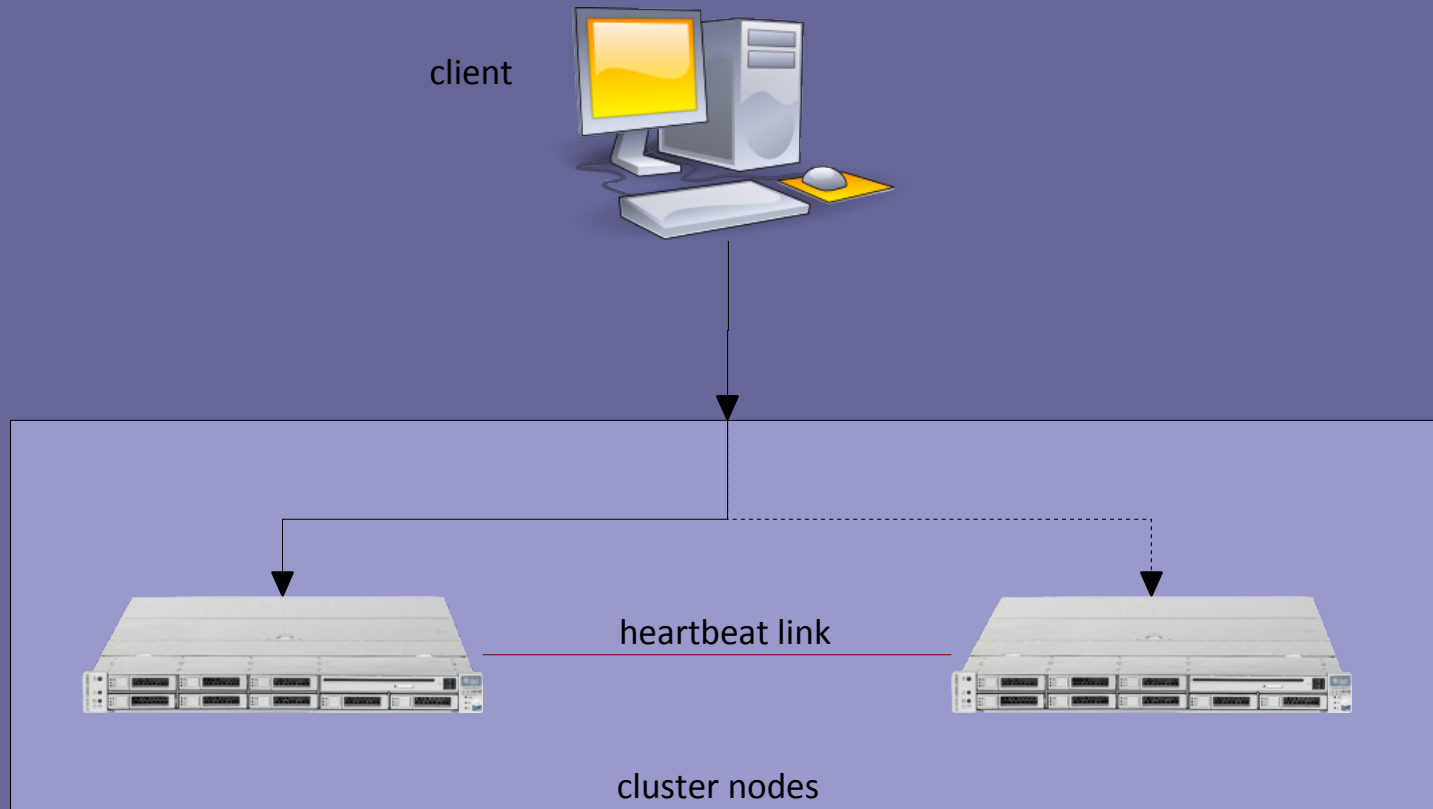
Ability of system to continue to service requests correctly in the event of component failure



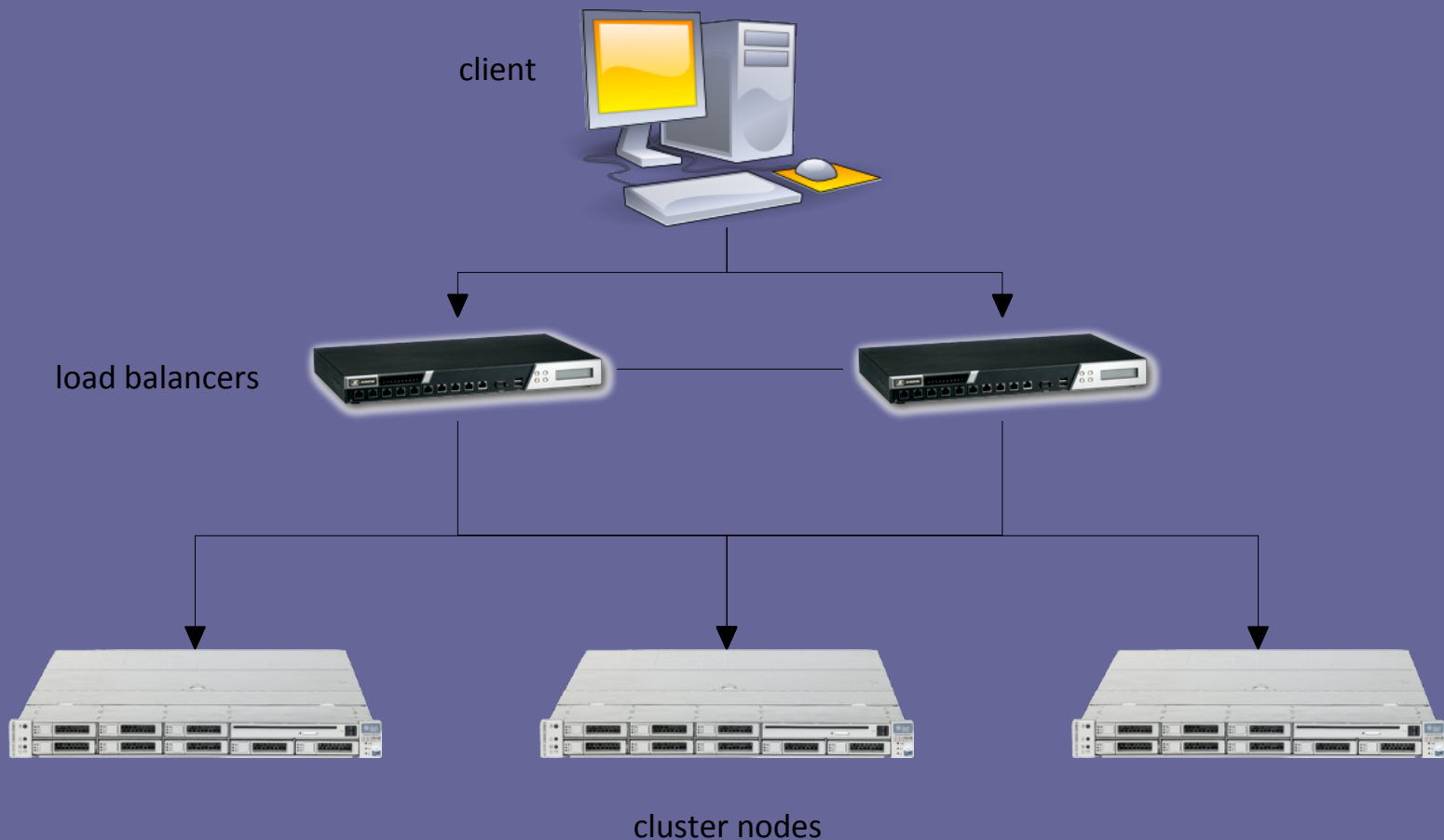
Client-side Failover



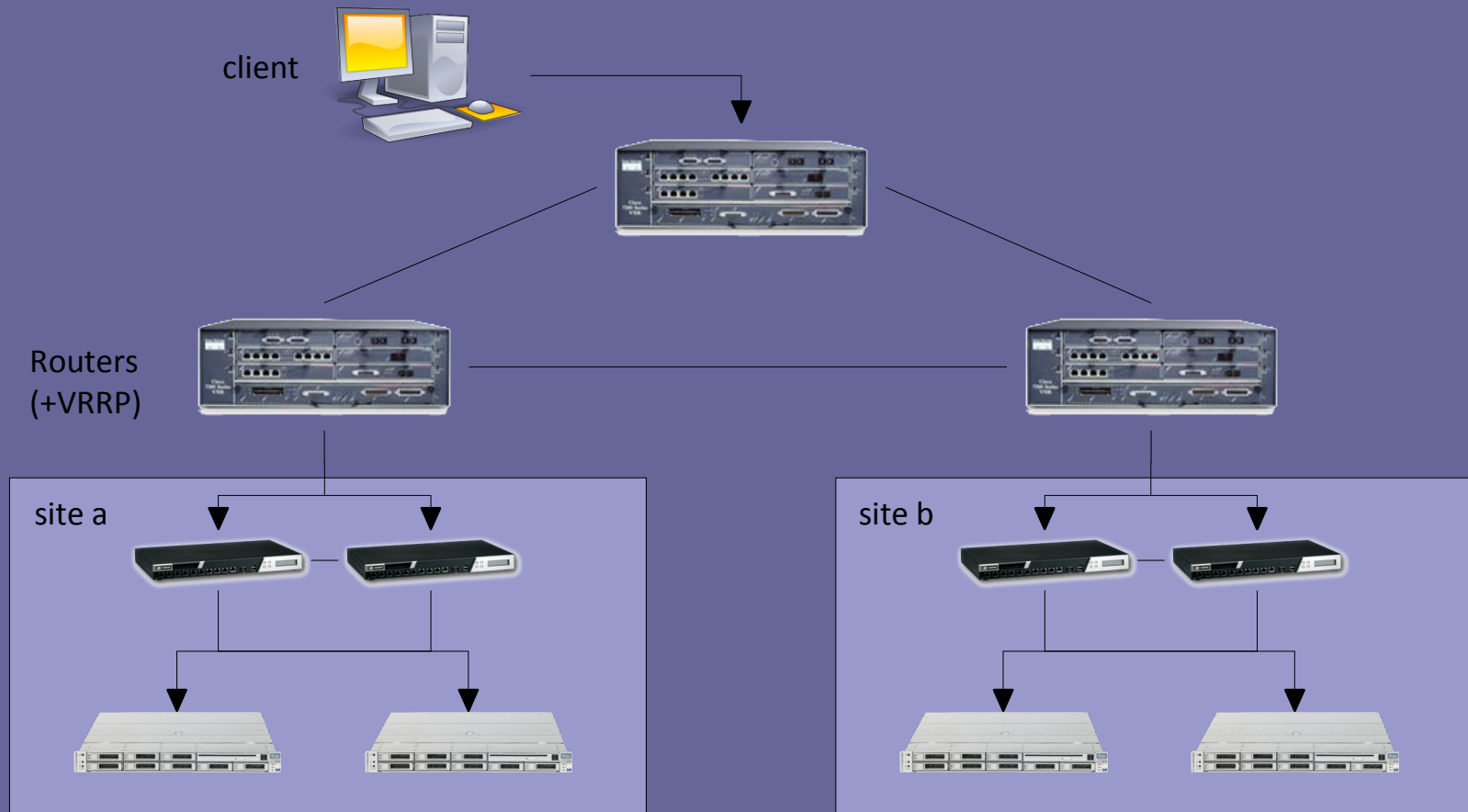
Active-Passive with Heartbeat



Active-Active with Load Balancing



Multi-Site Resilience

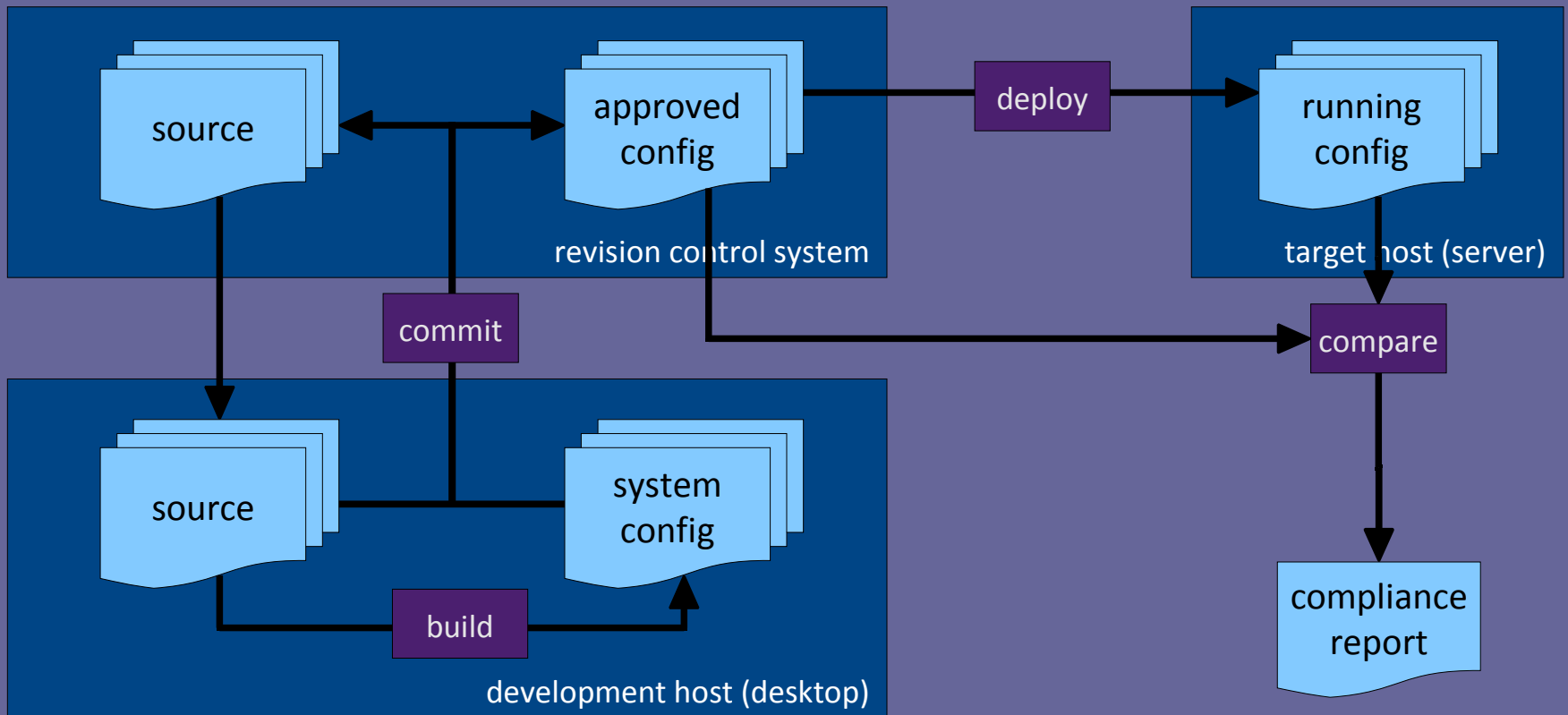


Virtualisation



Step 3
Design your Management Solution

Configuration Management



Standard Operating Procedures

1

Documented

On your team wiki?

2

Tested

Against your operational environments (staging)

3

Agreed

Peer-review, team buy-in – everyone on-board

4

Published

Listed somewhere everyone can see it

5

Monitored

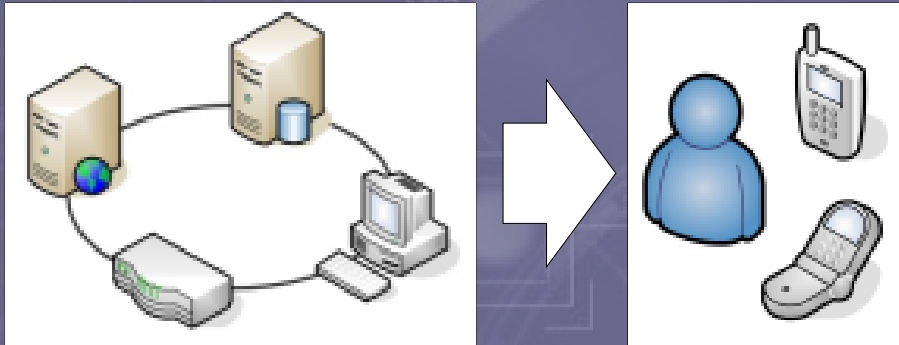
Record feedback on effectiveness, problems

6

Reviewed

Keep aligned with systems / tools, and improve

Monitoring



WHAT – WHEN
WHY – HOW

HYPERIC HQ
OPEN SOURCE

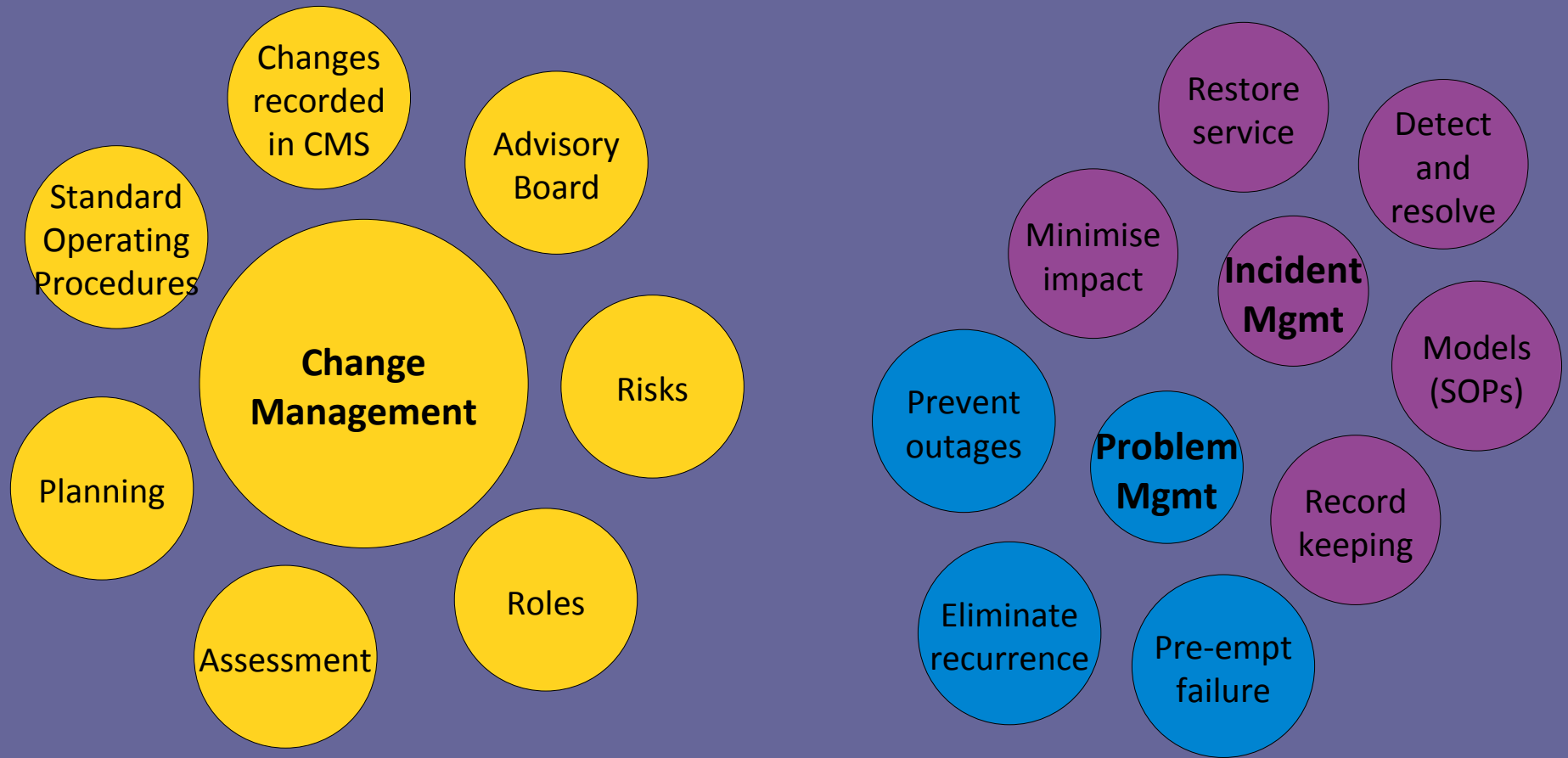
Zenoss[®]
Unlegacy IT Management

Foglight[®]

IPSWITCH
WhatsUpGold
IT Management Made Simple

Nagios[®]

Change Control and Other Processes



Questions

Slides and notes will be available
from the conference web site



Questions?