4.4 Availability Management

4.4.1 Mission Statement

*To optimise the capability of the IT Infrastructure and supporting organisation to deliver a cost effective and sustained level of availability that enables the business to satisfy its business objectives.*

4.4.2 Overview

Using availability management, ensure the availability of IT services as specified by the customer.

Availability management provides for reliable access to IT services. Availability means that the customer will always receive the expected services when they are needed. Good availability requires a low error or failure rate. If there is an incident or malfunction, it has to be rectified quickly.

Furthermore, availability management ensures that maximum benefit is gained from the existing IT infrastructure and services. Such maximum benefit is ensured by reliability of the services, and the ability to service and maintain the IT infrastructure.
4.4.3 Availability Management Activities

- Determine availability requirements;
- Prepare availability forecasts and plan the required measures;
- Prepare an availability plan;
- Determine the actual availability;
- Prepare reports;
- Reliability
  - Freedom from failure
  - Resilience of the IT Service
  - Level of Preventative Maintenance
- Maintainability – the ability to keep IT in operation
  - Anticipating failures
  - Detecting failures – Incidents
  - Diagnosing failures – Problems
  - Resolving failures – Known Errors
  - Recovering from failures
- Serviceability – the support provided by external suppliers
  - Service providers and customers must have an agreed availability period. The percentage of non-availability should be calculated over monthly or quarterly periods (not daily!).
  - UPCs (Underpinning contracts) and OLAs (Operational Level Agreements) must be included in SLAs for 3rd party suppliers and external maintenance contractors
- Monitoring – the availability of a server, for example, proactively trying to anticipate potential problems.
- Improve the agreed availability by applying the following methods:
CFIA - Component Failure Impact Analysis;
- Tabulates Services against users to establish parts of a Service and identify SPOFs.
- Matrix of VBFs, business areas and locations, corresponding infrastructure components and related support organisation.
- Impact definitions:
  - No impact on the service,
  - Inoperative service,
  - Alternative infrastructure element available,
  - Alternative infrastructure element is available, but the service has to be recovered first.

FTA - Fault-tree analysis;
- Uses Boolean logic to draw a network tree that can be used to identify the chain of events that may lead to a failure.
CRAMM: CCTA Risk Analysis & Management Methodology; risk analysis with a counter-measure plan;
- Assign numeric values to Assets, Threats and Vulnerabilities to calculate a number representing the relative risk to the service.
- Identify Countermeasures.
- Implement Countermeasures.
- Perform audits to confirm effectiveness of Countermeasures implemented.

TOP: Technical Observation Post used to identify the cause of a specific problem. Basically, observe the service through to failure then work out how it happened.

4.4.3.1 Calculating Availability
The formula for calculating percentage availability is:

\[
\% \text{ Availability} = \frac{\text{AST} - \text{DT}}{\text{AST}} \times 100
\]

Where:
- \( \text{AST} = \) Agreed Service Time
- \( \text{DT} = \) Down Time

A more accurate model takes into account the user base using the service:

\[
\% \text{ Availability} = \frac{\text{AST} \times n - \sum \text{DT}}{\text{AST} \times n} \times 100
\]

Where:
- \( \sum \text{DT} = \) total downtime for all users added together
- \( n = \) number of users

4.4.3.2 Calculating Availability of a system
The availability of a system is calculated from the availability of its components. How the components are connected in the end-to-end configuration will dictate how the availability is calculated.

4.4.3.2.1 Serial configuration
The Service Availability percentage for this serial configuration is based on the product of all the individual component Availability percentages.
Availability as viewed from the User workstation is therefore calculated as:

Availability = Workstation * Server * Network * Host

Calculation = 0.96 * 0.975 * 0.98 * 0.98 = 0.8989

Total Infrastructure Availability = 89.89%

4.4.3.2.2 Parallel configuration

The host now has a backup component to provide greater resilience.

The host component Availability percentage is now calculated as:

Availability = 1 - ((1-0.98)*(1-0.98)) = 0.9996
Host Availability = 99.96%

With the additional resilience provided for the host component, the total Infrastructure Availability can now be calculated as:

Availability = Workstation * Server * Network * Host
Calculation = 0.96 * 0.975 * 0.98 * 0.9996 = 0.9169

Total Infrastructure Availability = 91.69%

So by introducing an extra (resilient) Host computer, the availability has increased from 89.89% (serial) to 91.69% (parallel). For a 24x7x365 operation that represents 6.5 additional days of system availability in a year.

4.4.3.3 Availability Manager – Job Description

Duties & Responsibilities
accountable for the deployment, review and audit of the Availability Management process and associated methods and techniques
- determine the Availability requirements from the business for new or enhanced IT Services
- creation of Availability and recovery design criteria to be applied to new or enhanced Infrastructure design
- ensure the levels of IT Availability required are cost justified
- establish measures and reporting that reflect business, User and IT support requirements
- monitor actual Availability achieved versus targets and to ensure shortfalls are addressed
- produce and maintain the Availability Plan
- promote Availability Management awareness and understanding within the IT support organisation
- be aware of emerging technologies and IT best practice

4.4.4 Availability Management Benefits
- IT services are designed and controlled so that contracted availability is achieved;
- Service quality improves;
- New systems become more economical;
- The requirement for problem support diminishes;
- Maintenance and down time are reduced;
- Supplier performance is improved;
- More detailed information is available for service level negotiations;
- Existing IT resources are used more efficiently.

4.4.5 Costs
- £ Monitoring and Reporting Tools
- £ Staff and Accommodation
- £ Training

4.4.6 Possible Problems
- X Difficulty in finding skill or experienced staff
- X Difficulty in determining what availability if required
- X Lack of senior management buy-in

4.4.7 Metrics & Key Performance Indicators
- Availability
  - # of SOA recommendations
    - made
    - rejected
    - completed
  - # of SPOFs and Risks
    - identified
    - eliminated
- Reliability
  - MTBF by service/component
  - MTBSI by service
➢ **Maintainability**
  - MTTR by service/service provider

➢ **Serviceability**
  - MTTR by service/service provider
  - MTBF by service
  - MTBSI by service

➢ **Cost**
  - Tangible
    - End user downtime
    - Business downtime