Availability/Service Resilience: Summary of the Working Group Papers

Summary

The BCS ITLF Availability series of papers[1] have captured knowledge, guidance and recommendations on topics which, if not new, have highlighted the increasing importance in improving Service Resilience, particularly of complex, 24/7 operational systems. They have been produced through cooperation with members of the Availability/Service Resilience Working Group and in consultation with our wider networks.

This paper provides a map of the series of papers, and collates the outstanding recommendations, from the work in 2025. The papers below are grouped into those reporting on Round Table discussions, and those seeking to resolve some of the issues raised. The purpose of this paper is to stimulate cross-organisational interest in improving service resilience and to provide a framework for consultation within BCS and the wider network.

The work in 2025 builds on work of the Working Group published before 2025[2].

Definitions

The ITLF Availability working group define availability and resilience as below so that there is consistent use. Although these terms are often used interchangeably the following distinguishes them:

- Availability refers to the measure of how consistently a system is operational and accessible, high availability aims to minimize downtime and ensure continuous operation;
- Resiliency describes the system's ability to withstand and recover from disruptions, including failures and attacks; it focuses on the speed and effectiveness of response and recovery after a disruption or outage.

Improved availability often depends on increased resilience.

[1] https://www.bcs.org/membership-and-registrations/member-communities/bcs-it-leaders-forum/papers/

[2] https://www.bcs.org/media/jq3mdjh5/availability-service-resilience-background-and-links-to-blogs-and-reports.pdf

We focus on complex, 24/7, operational systems.

These systems are difficult to manage due to:

- Complexity of Real-World Environments: Operational systems have diverse user and operator behaviors, variable network traffic, hardware differences, many sources of software and services, and geographic dispersion.
- Non-Deterministic Behaviour: Systems with concurrent operations, real-time interactions, or machine learning components may exhibit unpredictable behaviour.
- Interdependency and Integration: Modern systems rely on third-party services, APIs, and integrations. Identifying whether failures originate from external (3rd party) systems or within the core product can require new forensic analysis skills. Integration of components built using different architectures or standards can cause unexpected disruption.
- Service Level Agreements. The challenges of either zero, or very short, time allowed for the unavailability of user services, within which to launch a new release will lead to the adoption of techniques such as canary releases, blue-green testing and alpha/beta releases for upgrades.
- Collaboration and Communication: Operational environments involve multiple stakeholders (developers, testers, product owners, operators, users), who may have different interpretations of requirements. Lack of clear, consistent communication can limit operational effectiveness.
- Managing Data: Processes in which data is accumulated over long periods of time require explicit consideration.

Papers reporting on Round Tables

A RoundTable on 9th January at the BCS, The Chartered Institute for IT offices, discussed *Availability: the challenge for IT Professionals*[3]. It recommended a number of topics to explore to reduce the impact of IT failures on users, the economy and society; and the challenge for IT professionals. The book, *Service Resilience, reducing the impact of IT failures*[4] was launched.

The same topic was discussed at two virtual Round Tables – one timed to accommodate the BCS Members in US and Canada, the other to accommodate

[3] https://www.bcs.org/media/ctlfyno5/availability-bcs-itlf-round-table-090125.pdf
[4] https://londonpublishingpartnership.co.uk/books/resilience-of-services-reducing-the-impact-of-it-failures/

BCS Members in Asia. The conclusions built on those of the ftf Round Table and were published in a combined report[5].

In April we[6] held a Round Table on *Lessons from IT failures at Nine Banks*. The RoundTable discussed the data supplied by the Banks, and what could reduce the number and impact of IT failures on users, the economy and society. This report, its supporting data and recommendations are based on the discussions at that Round Table[7].

A joint webinar with BCI[8] focused on *Availability: Improving Service Resilience* through methods of improving recovery processes to reduce the duration of outages[9].

Papers on Specific Topics

Modern societies are reliant on digital systems, so that IT is becoming regarded as a utility. Societies are also dependent on other utilities – eg water, electricity – as well as a range of other essential services (OES). We discussed utilities and their regulation, and the implications for IT as a utility[10].

Shortcomings in service resilience result in service outages that have consequences for the organisations providing these services, their customers and the wider economy. These consequences include corruption of or illegitimate access to data, revenue loss, and costs to customers. The analysis and estimate of the cost to the UK economy is in *Impact of IT failure on UK economy*[11].

The Round Tables all emphasised the need for differentiated *education and training*. Some of the characteristics of this, and steps taken by ITLF, are described in the paper[12].

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[5] https://www.bcs.org/media/jgzn4gbi/availability-5-virtual-round-tables.pdf

[6] In this text and others in the series of ITLF Availability Papers, "we" refers to the Availability/Service Resilience Working Group of the IT Leaders Forum of the BCS – the Chartered Institute for IT, and colleagues from our network who have provided additional insights.

[7] https://www.bcs.org/membership-and-registrations/member-communities/bcs-it-leaders-forum/papers/

[8] https://www.thebci.org/

[9] Link to BCI joint webinar

[10] https://www.bcs.org/media/fukpmjfb/availability-it-is-a-utility.pdf

[11] https://www.bcs.org/media/qcc03blp/availability-impact-of-it-failure-on-uk-economy.pdf

[12] See Education & training paper in https://www.bcs.org/membership-and-registrations/member-communities/bcs-it-leaders-forum/papers

IT is a utility; users expect utilities to work. Most of our business and personal activities depend on services which include digital systems signalling that IT is now a utility. The *FS Process*[13] is formulated to reduce the impact of IT failures on users, the economy and society by focussing organisational attention on Important Business Services and Impact Tolerances for these.

Most organisations measure availability of services in terms of duration of outages. The *NIS framework*[14] suggests that lost user hours, loss of data integrity, loss to life or health, and financial impact on users, are better measures to use as IT becomes more central to the economy.

Three terms were frequently used in the Round Tables: SLA's, ITIL and RACI. *SLA's*[15] have two roles in an organisation – defining the offer to customers and setting standards for suppliers eg in the IT supply chain. *ITIL*[16] is often referred to as a defacto standard for describing key activities in IT operations and maintenance. However, as there are no mechanisms or plans to review or adapt ITIL to reflect the changing IT operational environment, we recommend use of ISO standards which are supported by BSI training. A *RACI*[17] matrix can be helpful in assigning Responsibility, Accountability, who should be Consulted and who Informed, on metrics and targets for Availability.

One strong message from the Nine Banks Round Table was the importance of *information sharing* on vulnerabilities and outages across organisations[18] – highlighted by the increased use of *3rd party software and services* [19] by multiple organisations within a sector. The same Round Table highlighted the potential impact of improved *testing*[20] of changes to complex 24/7 operational systems, and the of use of *design for resilience*[21] thinking to improve operational resilience.

[13] https://www.bcs.org/media/2ucjm0ch/availability-the-fs-process.pdf
[14] https://www.bcs.org/media/czwjt34u/availability-the-nis-framework.pdf
[15] https://www.bcs.org/media/034nuwdr/availability-the-role-of-slas.pdf
[16] https://www.bcs.org/media/2unddscj/availability-itil-iso.pdf
[17] https://www.bcs.org/media/03hn1dju/availability-the-role-of-raci.pdf
[18] https://www.bcs.org/media/kmziec20/availability-information-sharing-on-causes-and-effects-of-it-failures.pdf
[19] See 3rd party and Open Source paper in https://www.bcs.org/membership-and-registrations/member-communities/bcs-it-leaders-forum/papers/
[20] See Testing of operational systems in https://www.bcs.org/membership-and-registrations/member-communities/bcs-it-leaders-forum/papers/
[21] See Design for resilience paper in https://www.bcs.org/membership-and-registrations/member-communities/bcs-it-leaders-forum/papers/

The proposals outlined in the Cyber Security and Resilience Bill[22] are welcome and timely. The wider scope of the framework for reporting of the impact of cyber incidents to include Critical National Infrastructure is a major step forward. In our paper *Treat IT resilience like we treat safety*[23] we express concern at the effectiveness of regulation and suggest that reporting of IT outages be made a legal requirement as for health and safety violations.

We have sought input from BCS Groups as appropriate to each topic: in particular we welcomed extensive input from SIGIST for *Testing*.[24]. A forthcoming paper from a Working Group member[25] describes *A Holistic view of Operational Resilience Using the 5-Layer IT Operating Model.*

Recommendations

Many of the recommendations proposed in the papers above have been implemented. Below we collect the recommendations that need further consideration/action by the Working Group and/or ITLF and/or other bodies.

(with for instance CBI) Develop and promote economic analysis supporting development of insurance for service failure risks.

(with BCS Policy Team) Work with government to support Transparency in the public sector.

(with BCS Marketing) organise/publicise

- events that develop and apply resilience management methods such as case studies or simulations.
- a prize related to making resilience work, possibly joint with IRM and/or BCI.

(with other SIGs) look for data and/or ask UKRI to initiate research on

- If resilience increases with the use of the more common languages, frameworks, technique

[22] https://www.gov.uk/government/publications/cyber-security-and-resilience-bill-policy-statement/cyber-security-and-resilience-bill-policy-statement

[23] https://www.bcs.org/media/ku4fdukn/treat-it-resilience-like-we-treat-safety.pdf

[24] See use of AI to improve service resilience paper in https://www.bcs.org/membership-and-registrations/member-communities/bcs-it-leaders-forum/papers/

[25] See A Holistic view of Operational Resilience Using the 5-Layer IT Operating Model in https://www.bcs.org/membership-and-registrations/member-communities/bcs-it-leaders-forum/papers/

- availability implications of open source.

(with ISSG) Seek to enhance and complement the terminology in place for cyber security, for use in sharing information on causes of outages due to IT causes other than cyber-attacks.

(with SIG[26] SM-ITAM) Strengthen BCS links to BSI and ISO, to discuss the potential for extending problem anticipation and other aspects of service management which have new focus for complex tightly coupled systems in a 24/7 environment. Track developments on ISO 27000, through our wider network.

(with BCS Education and Training) work with Training Providers and thought leaders to provide training on Management and operational challenges in new business environment; and Organisational leadership for IT professionals: engaging stakeholders, communication within and outside the organisation.

(with CIO-Net) continue to consult with BCS Apprentice Policy and work with Skills England on next steps for a new Apprenticeship route; work with BCS Marketing to promote the new CITP speciality; look for routes to developing education and training on the impact of third part supply on resilience of services to users.

Consult with the BCS VP – Chair Academy Board on next steps, including possible presentation at the Academy Board in October. Discuss with appropriate Universities eg Newcastle University re computer science training on resilience.

(with BCS SIGs IRMA and ISSG) Promote education and training around a Risk, Compliance and Contractual checklist.

(with BCS SIG on Enterprise Architecture) explore how design for resilience can become a core capability, with consistent approaches to design for resilience across both new and existing operational systems with e.g. The Open Group[27].

(with SIGIST) Publicise the risk-based testing approach for operational systems. Develop education and guidance for BCS members on tailoring testing approaches to business criticality, customer impact, and system complexity, and the use of testing tools.

[26] https://www.bcs.org/membership-and-registrations/member-communities/service-management-and-it-asset-management-sm-itam-specialist-group/
[27] https://www.opengroup.org/certifications/togaf9