techUK data centre programme

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COVID-19: Quarantine

Operational impacts

May 2020

Purpose and scope of this document

This document pulls together views from operators on the impacts that quarantine might impose on data centre operations, projects and capacity. This document is simply a collation of input, and not intended to be comprehensive or advisory. The contents will be subject to change in line with policy announcements.

Summary

Government is taking steps to limit the spread of infection whilst allowing economic activity to resume as far as is practical. Restrictions on movement still apply but are being relaxed. Considerable attention is now being paid to borders as potential routes for infection and we expect new guidance to be issued imminently on the introduction of quarantine measures.

Within the data infrastructure community there is concern that quarantine measures may present challenges to the resilience of our critical environments and the performance of services to customers. Key workers are sometimes flown in at short notice to address specific issues and in these, and other scenarios, some form of exemption will be needed.

Data centre service providers were asked about the potential impact of quarantine measures on their operations. They considered a number of scenarios: How might quarantine be imposed at country borders – on personnel or equipment, or both? At which points of entry? What are the imported labour scenarios for the sector that quarantine might impact? What kind of international visits need to take place? Are these essential to safe operation? What aspects of maintenance or site function depend on individuals or parts travelling to the UK from abroad and with what frequency? What would be the consequences of not receiving those parts and of those individuals waiting for 14 days in quarantine before getting to site?

Operators were primarily concerned with the operational impacts of delay imposed on staff and equipment needed for maintenance and repair within critical systems. There was also concern about the impact on installations, expansions, refitting, construction projects and sales which will have longer term consequences for the sector in terms of future capacity, growth and competitiveness.

Responses were categorised as follows:

1. **Personnel**
2. **Equipment**
3. **Coordination**
4. **Redundancy**
5. **Network connectivity**
6. **Case studies**
    a. **Operations**
    b. **Construction**

Quarantine impacts identified by data centre operators

1 Personnel

Commissioning Engineers: Large complex plant is often installed by employees or agents of the supplier. Since much of it is imported – chillers and UPS in particular, specialists come on site to commission equipment.

Servicing and repairs: Similar to installation, when large and/or bespoke equipment fails, operators call the supplier who sends an engineer. Factory based technical experts usually get on a plane at short notice to address problems with equipment.

Business units: Multinational operators often base individual business units in one country to service the group across a region.

Returning staff: UK based staff required to handle short term issues overseas, or seconded for urgent tasks, need to return to their core activity in the UK.

New customers: Customers seeking UK space for data operations will not contract unless they have visited in person. Customers are unlikely to be prepared to sit in quarantine – they will opt for domestic provision. This is a particular concern if quarantine is extended because if impacts competitiveness and growth.

2 Equipment

M&E: much mechanical and engineering plant is imported and almost all equipment contains components sourced from around the world. Operators asked whether quarantine would apply to physical equipment as well as to personnel and if so, for how long would it be imposed – eg 48 hours, 72 hours, and would that deemed to have been satisfied if sealed transit time exceeded that period.

Depleted stocks: Operators and domestics suppliers and maintenance crews hold stocks in the UK to enable scheduled maintenance, allow repairs to be carried out and replacement parts fitted, but in many areas stock and inventory is running low. Quarantine for parts would make this situation more problematic. Operators report that some of the hardest items to source at the moment are basic lower value components like cables that can usually be purchased at short notice off the shelf.

Specialist items: data centre equipment includes many specialist items – for example a chiller coil. If that fails the usual process is to send off to the manufacturer, maybe in Italy. Even without quarantine this has presented issues: for example letters have had to be sent to the Italian government to prove that the supplier is providing critical equipment so that the company is permitted to despatch stock and/or re-start its own operations.

Cumulative impacts from supply chain complexity: the complexity of the supply chain is likely to present significant issues if quarantine is introduced – for instance quarantine on a sub-component from China that is then used in a component in an assembly elsewhere and then that is used within a piece of equipment that itself is subject to quarantine – so the cumulative delay imposed by quarantine could be very long for equipment with a complex supply chain.

3 Coordination

Plant, parts and people: Coordinating the engineer, parts and machinery under a quarantine scenario would be particularly challenging – for example a large chiller or UPS needs an installation engineer and various other parts and equipment to be installed.

Customers and IT hardware: customer visits for installations or upgrades need to be carefully coordinated with equipment. For instance if a trading platform in Chicago wants to establish a UK operation within a data centre they will need specialist staff, network and ICT hardware, all at the same time in the same place.

4 *X*N+*n* to N (reducing redundancy)

Cascade failure: Redundancy is a crucial part of data centre operations and operations tend to be run at 2N, N+2, etc. to avoid cascade failure. For instance chillers are essential to keep the environment at a temperature that enables the servers to work reliably – unwanted spikes in temperature in a data centre can lead to server failure. Running at N risks cascade failures - for instance if other chillers have to work harder and then start malfunctioning and there is no redundancy thing can go very wrong very quickly. So it's not OK to run an operation at N whilst waiting for parts or people - redundancy is essential.

5 Network connectivity

Network equipment: international telcos are likely to have their international connection points located in data centres outside of their territory. To maintain international network connectivity and services they are likely to send engineers to that international connection point to fix problems.

Trading: An international bank or trader trading on a particular overseas bourse is likely to have their own equipment installed there. This will often require international travel to maintain the connectivity with that bourse. Something similar is true of the information providers for trading systems such as Reuters etc.

6 Case studies / member comments

a) Operational

"From a corporate perspective, we rely on a team of subject matter experts in Europe called our Design Technology and Engineering Group (DTEG) to provide expert support to all our DCs in Europe. If there was to be a significant technical problem, such as grid outage, or major technical failure, even if it had no customer impact, members of the DTEG would normally be called to site to assess the situation, analyse the root cause, help mitigate impacts and, most importantly, consult on the best way(s) to recover fully resilient service. In these circumstances we would also need to scramble a team of specialists from equipment suppliers from around the UK and maybe in the EU to work with our experts being flown in. The risk with outage is frequently when you bring services back up. These things are very difficult to manage remotely, since the recovery process normally requires

manual restarts, which have to be managed with great care/observation. We also conduct detailed root cause analyses which requires both data analysis and physical inspection'."

"Elements of the business like core network and IT are UK based, providing hands on and installation support to all of our European facilities whether they be live or soon to be so. The problem would not be them leaving the UK, it would be getting them back in. The same would apply to our EMS (electro mechanical solutions) vendors who are European based and are currently bringing our newest facility online for the customer".

"We are a vendor to places like our IXP in North America and in Saudi. That is not critical to UK infrastructure but it our ability to send staff there or to any of our vendors would impact us"

b) Construction

"Lack of ability to travel is currently slowing the progress of our European projects. Key European partners including architects, engineers and wider consultant teams remain detached outside of the UK; and inefficient due to separation. Some practical issues such as site surveys and validation require in-country presence so both UK and European projects are suffering delays."

"Our teams are unable to travel to finalise contracts and equipment purchases. Furthermore, we cannot travel to sign off equipment in other countries, that is required to be shipped to the UK for data centre construction projects. This equipment includes but is not limited to generators, transformers, chillers, CRAH units, switchgear etc. These items are the foundation of our data centres."

7 Contacts

Emma Fryer
Associate Director, techUK
Tel: 01609 772 137
Mob: 07595 410 653
emma.fryer@techuk.org

Lucas Banach
Programme Assistant
Tel: 020 7331 2006
Lucas.banach@techuk.org

For more information:

- techUK data centre hub: https://www.techuk.org/covid-19-information-hub/data_centres
- DCMS mailbox: COVID-data-resilience@culture.gov.uk
- Uptime bulletins: https://uptimeinstitute.com/covid-19-minimizing-critical-facility-risk

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