

Engage Consult Information Governance and Management

Data Centre

The service is delivered from one of the [Ark data centres](#) in Corsham, Wiltshire, and are assessed as being *Uptime Institute Tier 3*. These have been designed to exceed the requirements of the Institute's definition for a Tier 3 data centre, with many elements achieving the requirements for Tier 4. The facility is protected by a robust framework of physical, technical and logical security controls, which ensure the data, applications and ICT infrastructure are afforded the highest possible levels of protection and resilience. Such controls include: 24x7x365 dedicated manned guarding, with control rooms and mobile security personnel. Military grade fencing, full height turnstiles and perimeter protection sensors and beams. Solid construction of all walls and floor slabs (No windows)

Triple-authentication access control, incorporating ID cards, PIN and biometric data. Extensive external and internal digital CCTV coverage with on-site and off-site recordings. Segregated delivery and loading/unloading areas, incorporating strategic airlocks. Formal "white list" access lists. Robust procedures for visitor and emergency access. Resilient diverse power feeds, supplied from separate sub-stations. Extensive UPS capability. External validation by CESG (PGA), the UK government's National Technical Authority for Information Assurance - now part of the [National Cyber Security Centre](#) - and accredited against *ISO27001*, *ISO22301* and *JSP44*

Physical Platform

The Patient Services Framework (PSF) runs entirely within a virtualised environment (VMware) that is assured to *OFFICIAL*. This platform is supplied by [UKCloud](#), a company with whom Wiggly-Amps have a close working relationship, a dedicated UK cloud services supplier for the exclusive use of public sector organisations.

The hardware is enterprise grade and fault tolerant with storage via a shared storage array. Hardware is vertically segmented into "Pods" to give availability zones within a data centre, with further protection available by the use of live replication to a different facility.

Connectivity

Acting as an aggregator, **UKCloud** makes multiple networks available to the PSF:

- **Internet:** for patient facing services. This connection is also protected by a managed Distributed Denial of Service (DDoS) mitigation service.
- **N3:** for surgery facing services and access to NHS data sources such as locally hosted clinical systems and Spine resources (PDS, SDS etc.)
- **Restricted LAN Interconnect (RLI):** for services to be presented to the MoD (Pending)

Software Defined Network (SDN): to connect the service components, a private network is defined. This is isolated from all other connections i.e. there is no IP route between them.

In order for Wiggly-Amps to connect to these services, a process is undertaken with **UKCloud's** assurance team to demonstrate the compliance of the PSF. Platform architects were consulted throughout the design process to ensure the PSF would achieve these connections.

The PSF is almost exclusively based around a collection of Linux Virtual Machines, with the exception of one component with a Windows dependency. The framework is structured according to the following hierarchy:

Virtual Data Centre (vDC) This is the top level container for the PSF. Wiggly runs 2 vDCs, one for production and a mirror for QA/Testing, known as the *Edge* environment.

Virtual Appliance (vApp) A collection of Virtual Machines and other components that are operated and monitored as a unit. Within the PSF, each vApp is a self-managed, scalable deployment of a product component.

Virtual Machine (VM) A compute instance corresponding to an individual server

Infrastructure as a Service (IaaS) Platform resources; specifically storage in our case

Scalability and Capacity Management

Patient facing services present the challenge of deep troughs in demand overnight, followed by peaks first thing in the morning. The virtualised nature of the PSF is ideally suited to these usage patterns and allows a rapid response to demand whilst keeping costs firmly under control by closely matching supply and demand. This is achieved by making each vApp self-monitoring and self-regulating. Due to **UKCloud's** provisioning policies of no more than 1000 VMs per pod, there is no realistic probability of us reaching the physical platform's capacity.

Change Management

The software build on each of the VM servers is identical and configuration changes within the vApp container are transparent to the end user. Provisioning of vApps and VMs is an automated process using scripts that have passed through QA and Testing. Deployments are managed using [Puppet](#) to create instances that are automatically built from source using the [Jenkins](#) continuous integration server.

When a new release of a product is ready, it is deployed to our *Edge* QA environment using a release process that is a product deliverable. Following successful completion of testing, it will be deemed ready for production.

Monitoring and Alerting

The use of [Elastic](#) and [Kibana](#) to store all system events allows a high level of customisation for reporting and other data analysis operations. This also makes custom reporting to meet customer requirements easy to implement; for example:

- Service utilisation by organisation
- Average duration of session / time to carry out an action
- Reporting on SLA metrics, such as EUITs

Capacity management and faults in the platform are handled by a combination of [Zabbix](#) agents within the vApps and off-network monitoring services. Intrusion detection is by [Open Source HIDS SECURITY \(OSSEC\)](#) and reports through the same channels.

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