IFS Cloud

Platform & Architecture

Contents

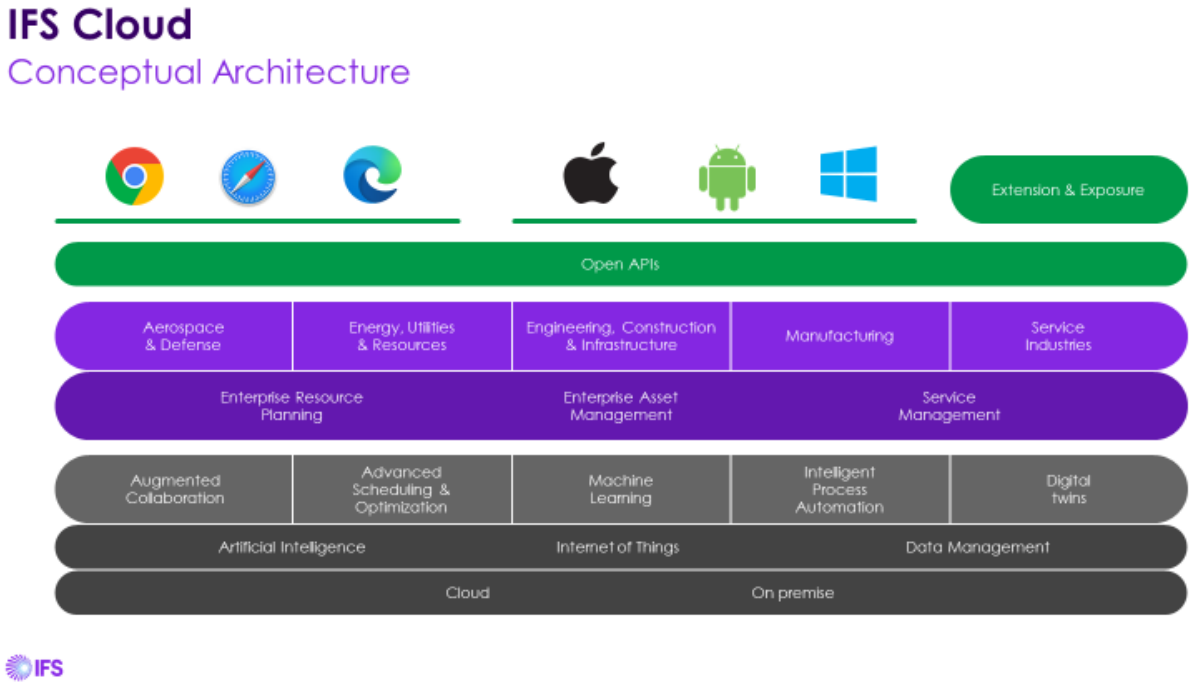
1.0. Introduction

1.1. IFS Cloud Platform

IFS Cloud is an enterprise grade cloud native platform that delivers class-leading solutions across Service Management, Enterprise Resource Planning and Enterprise Asset Management. It delivers the full spectrum of IFS capabilities from a common platform, with solutions tailored to a specific industry and functional needs. With consistent user experiences and solutions that work together out-of-the-box, IFS Cloud is simple to use and tailor, making it easy for the customer to extend and connect other software in the landscape. Customers can implement the solution that fits their needs and add new capability as requirements change and grow thanks to the highly scalable architecture.

- Cloud Native Platform
- Deep Industry Focus
- Embedded Innovation
- Open & Connected
- Residency of Choice

IFS Cloud is built on a common technology platform that brings innovation and work-enhancing experiences to life for your business. Intuitive user experiences, the ability to connect and extend using 100% open APIs, intelligent process automation, machine learning (ML) and optimization, reporting and analytics capabilities, are all applied directly throughout IFS Cloud, from the same platform. This provides consistency regardless of how many functional capabilities in IFS Cloud you use. The platform also provides full support for your solution lifecycle, along with the security and reliability you need to trust IFS Cloud to run your business.



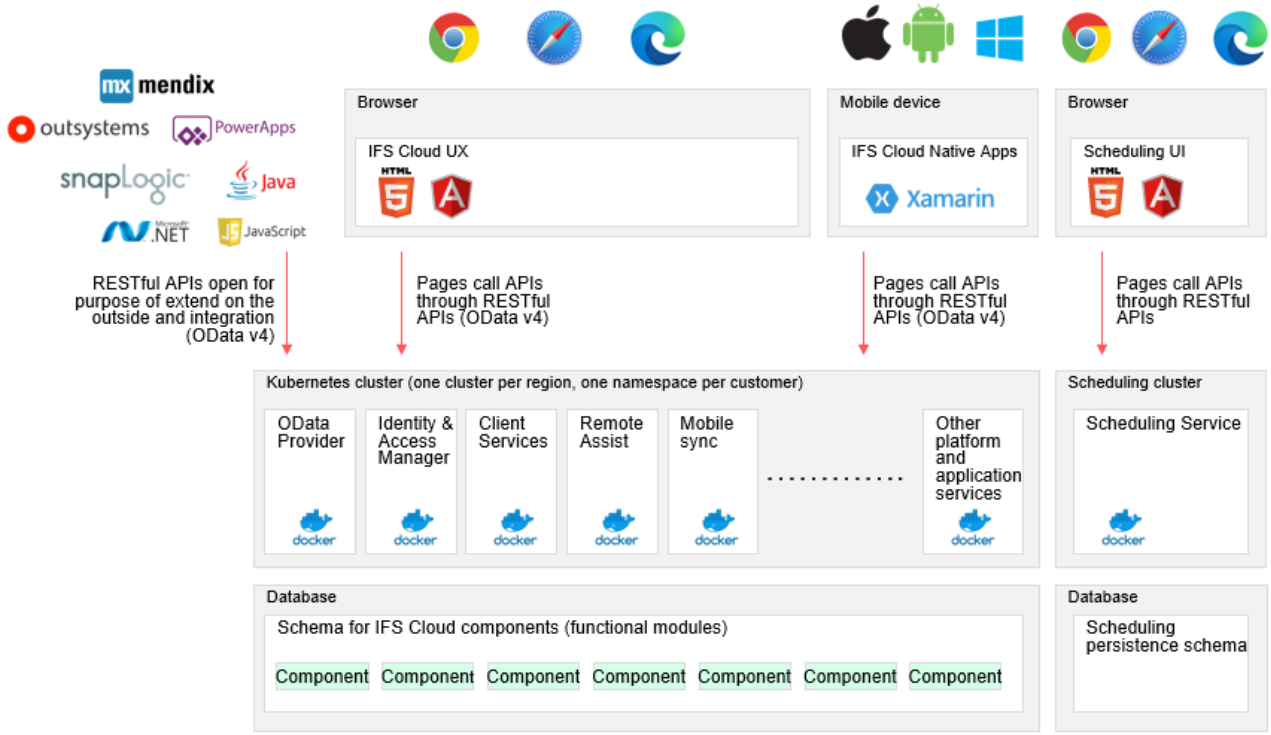
1.2 Multi-Tier Service Oriented Architecture

IFS Service-Oriented Architecture is both layered and multitiered. Each tier has its own job to do and does it in a standard way with a clear separation from, and interface to, other tiers.

The fully normalized data storage tier is based on the relational database model and runs on industry leading Oracle RDBMS. Azure SQL Server may also be used depending on the final configuration of modules. Both the database technologies are proven in large-scale enterprise deployments. To guarantee data integrity, the data can only be accessed and modified through the business logic using RESTful API's underpinned by PL/SQL. Business logic implements business knowledge, functionality, and processes.

Containerization in the middle tier achieves efficient resource usage, while simplifying administrative tasks like updating or patching applications. Middle tier services such as OData API back-end, Identity & Access Manager, Client Services etc. are delivered as Docker containers orchestrated by Kubernetes. This allows highly scalable cloud native architecture that can also be deployed on-prem if required.

The presentation tier provides interaction with human users and client-side applications and devices. The same business logic serves all of IFS' interfaces, such as web browsers, mobile apps, add-ins to Office or other productivity software running on any device including tablets, smart phones or PCs. Clients access the business logic using the https protocol. This allows easy passage through firewalls, proxies, and other network infrastructure. Integrations and customer interfaces access the business logic through the same access providers as used by IFS Cloud clients.

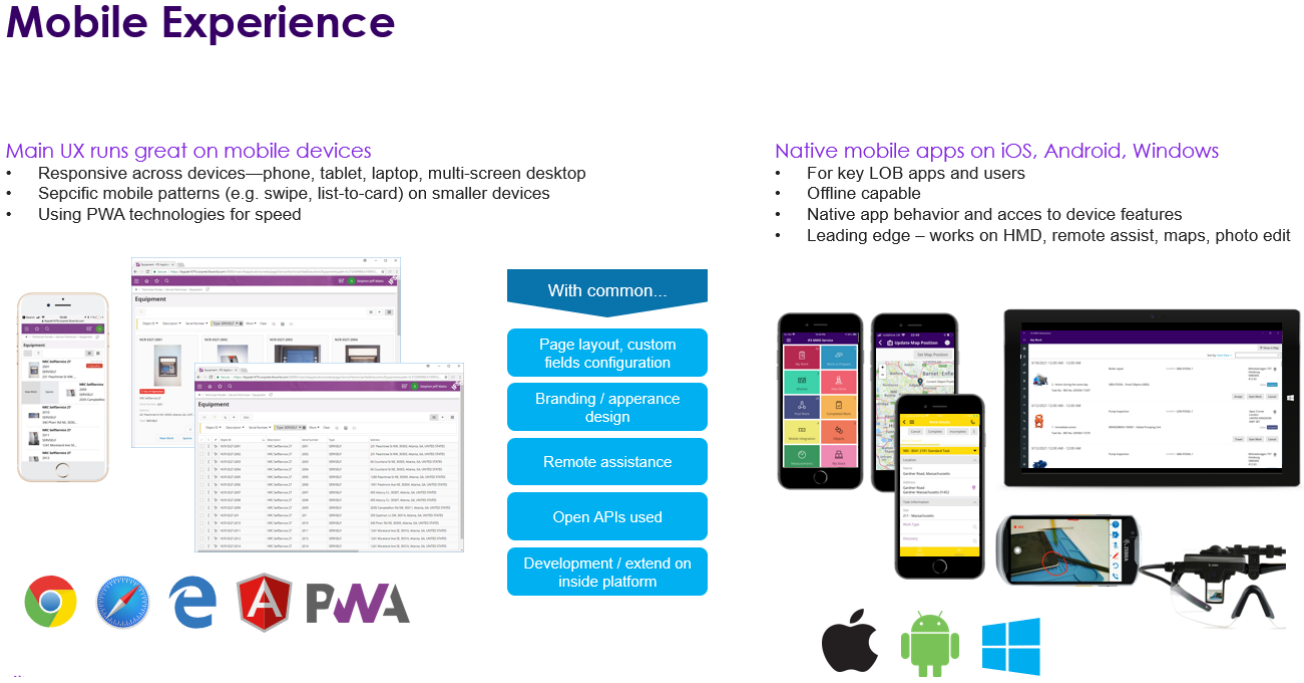


When deployed in the IFS Cloud Service (SaaS), IFS utilises Azure DevOps CI/CD pipelines with HELM charts for automating deployment tasks. Release deployments can be triggered by customers using self-service Application Lifecycle Experience Portal (ALE). A monitoring stack is also deployed for analysing various logs and metrics to keep the customer environments running smoothly.

2.0. General Platform Overview

2.1. User Experience

Built within a state-of-the-art HTML5 web client, users can access the entire application anywhere on any device. IFS Cloud also comes with a pre-packaged solution for construction including 100+ out-the-box lobbies (dashboards) covering the entire solution from bid to contract, planning and pre-construction, procurement and material supply, construction and execution, commercial, periodic project review and the supporting processes of quality, rental management, human capital management and financials. Whilst these lobbies are completely configurable, it is important to note that construction organisations are not at a standing start when it comes to implementing IFS Cloud.



2.2 Tailor and Extend

Tailoring is the process of adapting, or adjusting, the standard IFS Cloud solutions to fit even better for a specific business. It typically involves performing configurations (e.g. of the user experience or process automation), developing reports and integrations, and where motivated also perform customizations to extend or change aspects of the solution.

IFS Cloud offers three ways that tailoring can be done:

- Configure
  Consultant and power-user friendly designers and tooling to extend the data model, change the user interface, automate processes and much more. This gives you the freedom to change screen layouts, add new fields, add new pages and create automated processes and validations as per your specific business rules and requirements.

- Extend on the inside
  Customize using the IFS Cloud platform in order to add, extend or override functionality. Using our low-code development environment and layered architecture to separate customizations from the core application

- Extend on the outside
  Use low code development platforms like PowerApps and Mendix, integration platforms like Boomi, or just develop custom clients and integrations using the technology of your choice.

Tailor and Extend

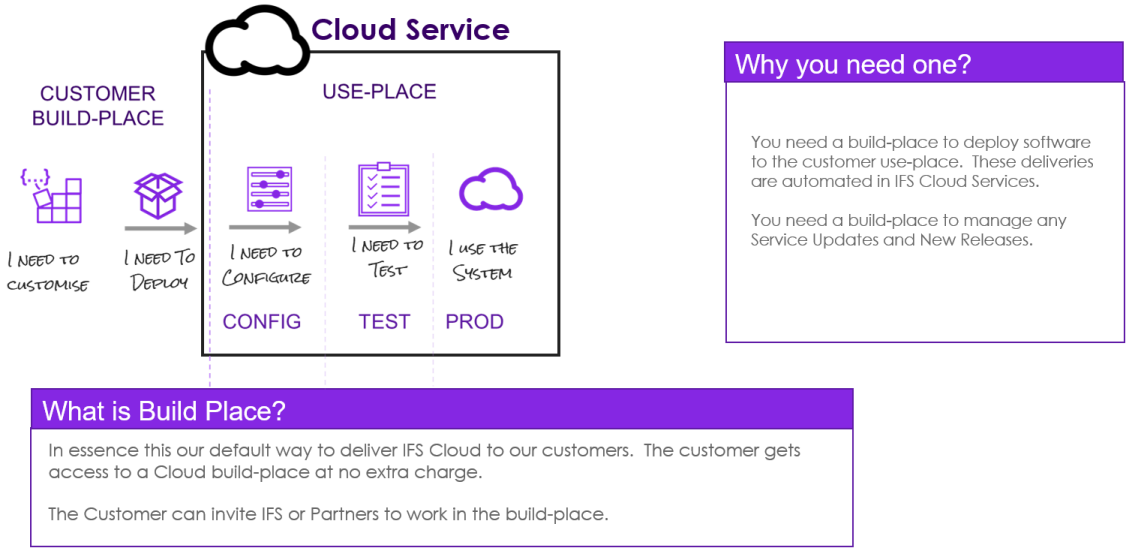
All IFS Cloud customers get access to a cloud based Build Place for tailoring and updating their solution. Temporary Dev/QA environments can be provisioned using the Application Lifecycle Experience Portal for these activities. Once the changes are tested, committed, deliveries can be created and deployed on to the persistent Use Place environments with customer data.

2.3 Lifecycle Experience

The lifecycle experience (LE) covers the whole process from initial discovery and exploration of solutions, to optimizing usage of the solutions years after go-live. The Lifecycle Experience has four phases - Explore, Define, Build and Use. This contains multiple constituent features.

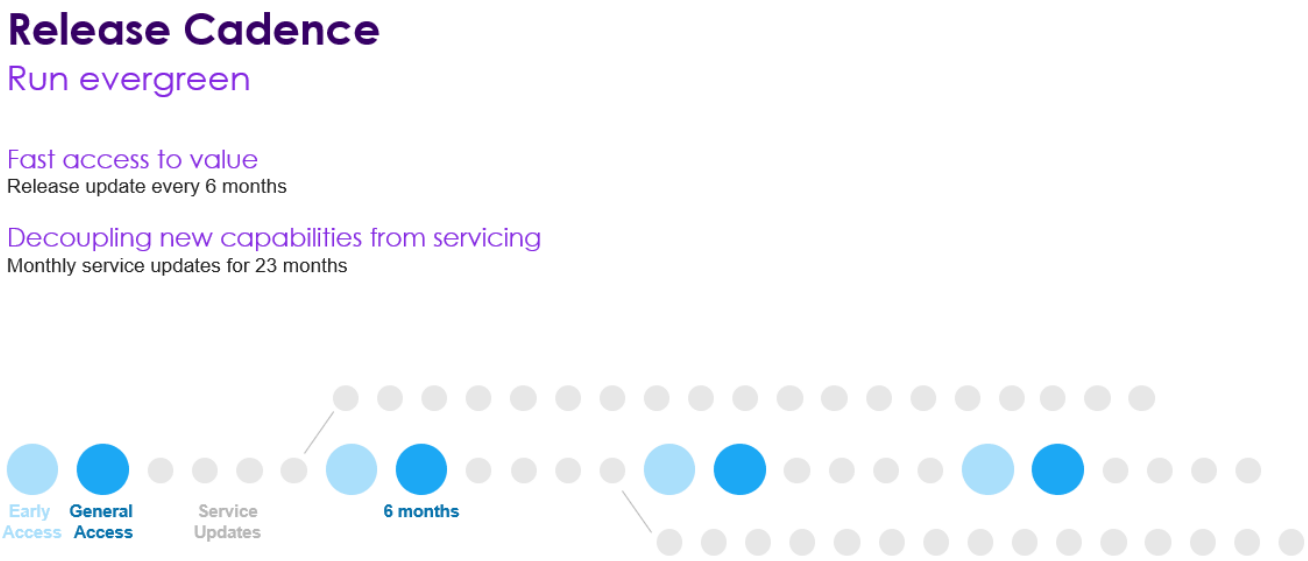
- IFS Cloud Master Repository – consists of all IFS Cloud core releases.
- IFS Developer portal - published on developer.ifs.com. The assigned solution developer will download IFS Developer tools required for development on IFS Cloud from the developer portal to their
- local workstations.
- Azure DevOps Services - consists of Azure repositories and Azure pipelines which are used for code management, build management and delivery management of the customer solution.
- Azure Resources - self-provisioned Azure VMs consisting of IFS Cloud Environments ordered by the users of the IFS Lifecyle Experience solution.
- IFS Lifecycle Experience Portal – combines multiple touch points to give you access to information, tooling, code, and permissions that will put you in control of your application. This is where you access
- the Build Place.
- The Build Place - fundamental building block of the lifecycle application and a service where customers, partners and IFS come together to customize, build, and deploy the customer solution.

Build Place vs Use Place



2.4 Evergreen Updates

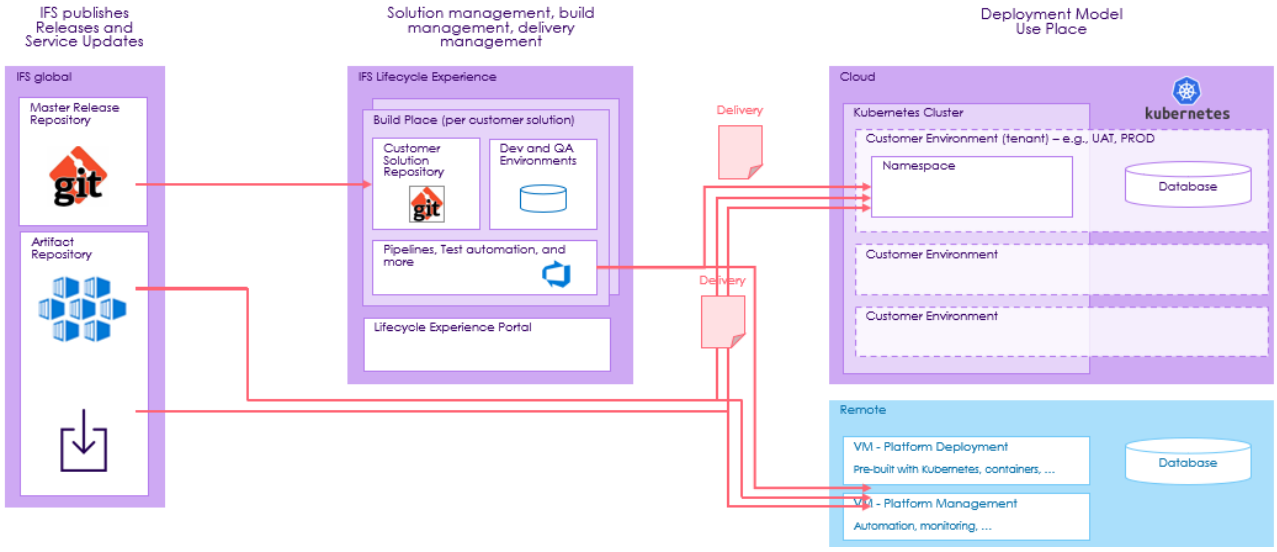
IFS Cloud operates on a bi-annual Release Update (RU) cadence supported by monthly Service Updates (SU). This enables customers to be on the latest release of the platform without the need for costly upgrade projects. There is a clear separation on functional enhancements delivered in Release Updates from the critical fixes delivered in Service Updates.



Release Updates and Service Updates will be published to IFS public repositories, and can be pulled in to customer's solution repository in the build place for merging and testing activities. Once tested, deliveries can be created and deployed on to the Use Place environments.

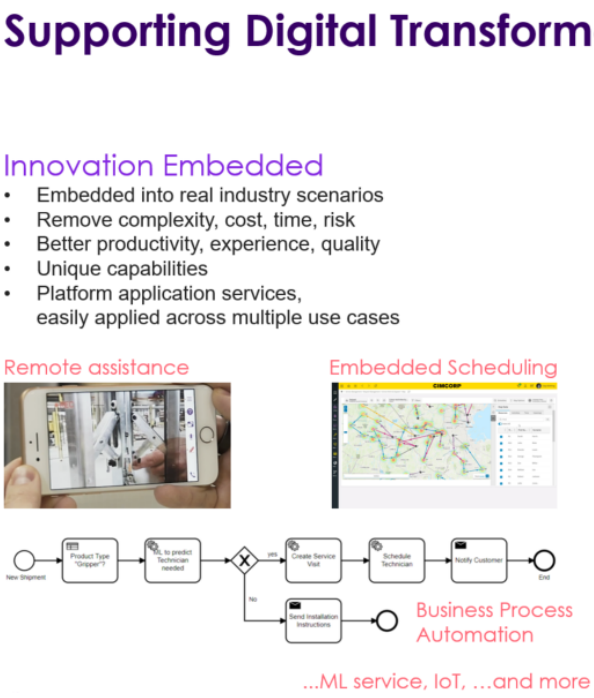
Architecture

Highest level



2.5 Embedded Innovation

A primary design objective of the IFS Cloud platform is to assist customers with their digital transformation and making intelligent and autonomous enterprise a practical reality. There are two factors that are critical for this. First is the need to provide innovation embedded into real industry use cases so that customers can benefit from it straight away. Having these capabilities embedded in our solutions removes complexity and thus cost and risk of integrating with multiple solutions. In addition, it also lets IFS provide unique capabilities that could not be achieved if these technologies were bolted on the outside. For example, when augmented reality is used for remote assistance, we can automatically bring up the correct customer, work order, spare parts information for the receiver of the call since we know the context (i.e. a customer service visit) form which the call is made. For machine learning models we are able to do explainable AI so that when there is debate over a decision the AI has done, it is possible to trace back and see how the AI arrived at that decision. Second factor is supporting customer's own innovation. They might want to do their own analytics using data ingested through IoT, perform own ML scenarios, or create their own automation using Business Process Automation. To achieve this one needs access to the data – both transactions as well as other data such as images and documents held within our application. That's why it is fundamental that IFS Cloud comes with a complete set of open APIs. The truth is it is not a choice between having innovate new technologies embedded in business applications or developing such capabilities on the outside. If you really want to be a challenger in the industry it is about leveraging both.



3. IFS Cloud Security

3.1 Compliance & Accreditation

Security is of paramount importance for any business system especially when you operate on highly regulated industries. IFS take the security of our services extremely seriously and hold ISO/IEC 27001:2013 Information Security Management certification, SOC1 Type I (ISAE3402), SOC1 Type II (ISAE3402) and SOC2 Type II (ISAE3000) compliance for the cloud service. Security is embedded into the IFS software development process with Static Applications System Testing (SAST), Dynamic Application System Testing (DAST) and OWASP (Open Web Application Security Project) compliance in place. All artifacts including container images go through vulnerability scanning prior to being released. IFS utilise industry best practices for our cloud services, including:

- Data encryption both at rest and in transit as default
- Secure, fully segregated single-tenant architecture to ensure separation between customer environments
- Web Application Firewall, Proxy and Ingress/Egress Controller features built into the architecture
- Virus and malware protection
- Platform-level DDoS detection and protection
- Application and infrastructure monitoring

IFS engage an independent 3rd party specialist organization to run security penetration tests on product releases. These tests cover the latest software version current at the time of test, and include all standard core product modules. Testing takes place from the internet towards a dedicated, production-grade environment which is built and maintained using the same architecture, design

standards, tooling and processes as all customer environments. A formal report is compiled as an output of this testing process, detailing any issues found and assigning an associated risk rating based on the industry standard CVSSv2 scoring system. In order to protect customer cloud services, and in line with common practice across the industry, customers are not permitted to run their own tests against environments running in IFS' cloud. However, customers may request a copy of the latest independent test report covering their version of the software under appropriate NDA.

3.2 Connectivity and Authentication

IFS Cloud is a true cloud-based product and all access to the solution is via the public internet. Connectivity is fully encrypted with 2048-bit RSA public key encryption using TLS over HTTPS. As with any cloud service, it is important that customers provision adequate internet connectivity for their user community in order to utilize the solution. IFS Cloud incorporates a fully featured standard user identity and access management solution. When running under the cloud deployment model, customers can choose between the IFS Cloud integrated Identity and Access Management solution (IAM), or a suitable OpenID Connect compliant provider such as Azure AD. This can provide additional security features such as Multi Factor Authentication (MFA), Single Sign On (SSO) and Conditional Access.

3.3 Application Security

The business applications themselves provide trustworthy user security models, ensuring user access to information can be provided on a 'need to know' basis. IFS Cloud, for example, enables the creation and management of role-based user accounts that can limit access to data and functionality to a low level of granularity where required to protect the most sensitive information. The security model is supported by the ability to define segregation of duty rules, which are frequently used to ensure adherence with company finance policies, but equally can be used to help prevent the allocation of user permissions which may conflict with data protection requirements. Data visibility can be restricted between parts of the customer's organization to support data transfer restrictions arising from GDPR for example using built-in application constructs such as 'Company' and 'Site'. IFS Cloud utilise the concept of 'Permission Sets' in facilitating Role Based Access Control (RBAC). A Permission Set groups several privileges so that they can be granted to and revoked from users/user groups simultaneously. Privileges are always granted to users through Permission Sets and never directly. IFS Cloud also contains extensive history logging capabilities to trace each action performed by an end user logged in to the system.

3.4 Support for GDPR

IFS Cloud also contain functionality that support compliance with GDPR requirements through all the key processes related to personal data management.

Lawful Collection: IFS Cloud contains features for allowing each data subject to be identified and have one or more defined purposes for the information processing attached to them including durations.

Secure Storage: Role based access control is enforced and supported by functionality for management of data subjects, personal information items, purpose of data processing, data removal and ammonization and date-controlled consent. Data can be encrypted at rest.

Secure Recall/Relay: In built reporting mechanism for outputting information related to data held, the purpose for which data is held with relevant expiry dates and the legal basis to which the data and purposes comply. Data is encrypted in transit.

Secure Maintenance/Removal: Provides features for the data controller to clean up data, remove or anonymize (if appropriate) and the expiration of the data as required

Lawful Usage: Provides a single-entry point to access and control the purposes and basis for processing

For more information and latest news relating to IFS Cloud security please visit IFS Trust Center https://www.ifs.com/resources/trust-center/

4. Five Reasons to Choose IFS Cloud

1. **One Single Platform**
   Modular technology, delivered on a single platform which means…

   - Ease of deployment and flexibility to phase implementation at your own pace
   - Consistent user experience across the entire platform
   - Seamless flow of data between business functions and processes

2. **Industry Depth**
   Construction best practice processes and an industry focussed product roadmap…

   - Solution built for your industry – e.g. Project Financial Control, Commercial Management, etc.
   - Solution breadth to cater for diverse construction business types – e.g. Service and Facilities Management, Offsite & Modular Manufacturing, Asset, Plant and Equipment Management.
   - Choosing IFS Cloud not only includes what is in there today, but also what is coming in the future. We provide transparency and issue an updated roadmap twice a year.

3. **Innovation Embedded**
   Cutting edge technology built into the product as standard...

   - Embedded innovations designed for real industry scenarios throughout the IFS Cloud solution
   - The platform provides innovations like business process automation, augmented collaboration, and remote assistance, IoT, and a host of other application services
   - 100% open RESTFul APIs to extend, connect and integrate with wider IT landscape

4. **Cloud or On-Premise**
   Built for the cloud but also available on-premise giving you freedom of choice…

   - 1st Choice: **Cloud** - We provide IFS Cloud as a service to you from our cloud—connect to the service, and we take care of the rest

   - 2nd Choice: **Remote** - Your IFS Cloud solution is managed (tailoring's, updates) in our cloud but the production and test environments are deployed in a “remote” location of your choosing. We supply a packaged installation which you operate together with the main database, on supported platform software.

5. **Delightful User Experience**
   Modern, mobile, and easy to use…

   - Browser-based (HTML5), responsive user interface providing a truly mobile experience across the entirety of the application.
   - Designed using ‘consumer first’ design principles for intuitive navigation and quicker user adoption
   - Freedom to tailor the user experience to your business – from appearance branding to configuring screens and processes.

https://www.ifs.com/contact-us