

IFS Cloud25R1EA

Sizing Guide Paper

IFS-Remote installation



This paper provides general sizing recommendations for **IFS Cloud 25R1** installed as IFS-Remote installation and based on the solution set “**IFS Cloud for ERP**”. It is written for an audience familiar with IFS Applications architecture including the different types of server related terminology.

This document is for informational purposes only. It is not a commitment to deliver and may not be incorporated into any contract.

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General

The purpose of this paper is to enable you to make appropriate decisions when it comes to sizing hardware for IFS Cloud 25R1 IFS-Remote installations.

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This guide supports you in sizing base and middle tier servers used by IFS-Remote Cloud 25R1 in an on-premise solution. Figures shown in this document is made up by a combination of tests and assumptions.

Prerequisites & Assumptions

- Only the relevant containers to the solution set "IFS Cloud for ERP" have been deployed. And only the ones needed to be upscaled due to test load has been appropriately scaled. Containers are deployed with a minimum of two replicas.
- IFS-Remote Installation is made with scale of 100 and a cpuRatio of 20 and memRatio of 100 in Kubernetes configuration.
- All user load is based on IFS Cloud Web Client tests, alternative load will change requirements. Using other client load will change the assumptions and change the outcome.
- Changing configuration on MT will change server requirements.

Solution set

Solution Sets are a bundle of pre-defined capabilities that offer a ready solution targeted to specific industry. The Solution Sets play the role of a pre-packaged bundle of various capabilities containing a set of modules. From the list of solution sets we have chosen the "ERP" with its definition in "solutionSetId: IFS-CLOUD-ERP".

The solution set is important to sizing as it controls what containers that will be deployed in the MT Kubernetes cluster. This deployment configuration will have effect on different resource usage, like CPU and memory.

Sizing

The sizing and especially CPU is done from doing test with predefined load on defined hardware and the relationship is then worked out from that. When it comes to Memory it works slightly different, for MT the memory is worked out from the configuration of containers that will end up in needed memory, details of the number of containers are shown later. For DB the memory is worked out from the test but more from experience and feedback on the numbers on previous guides throughout the years.

The tables show the needed CPU configuration and memory amount to service the number of users in a system. The performance index given in table can be matched with current “SPEC CPU 2017” and specifically base of “CINT2017Rate” and values are available at <https://www.spec.org/>.

Note. All minimum requirements need to be fulfilled together.

Containerized Middle Tier CPU			
Users	Min - SPECINT 2017 Rate (base)	Min - Threads/Cores	Min - Memory (GB)
150	40	20	128
300	55	20	128
600	110	20	128
900	155	24	128
1200	195	24	144
1800	290	28	144
2400	360	28	160
3000	450	32	160

Base Server (Database) CPU		
Users	Min - SPECINT 2017 Rate (base)	Min - Memory (GB)
150	40	48
300	45	64
600	85	80
900	130	96
1200	170	112
1800	255	128
2400	340	144
3000	420	192

Middle tier container details

The middle tier on Kubernetes size is defined by the helm charts together with installer, where the combination of pre-set sizes and the overall settings in installation step will determine the size on each POD's in the cluster. The main configurations settings used is:

- Scale of 100
- cpuRatio of 20
- memRatio of 100

Since the replicas start with 2 as a minimum, we can handle several on the user loads levels without needing to scale up until 1200 users.

Container Replicas vs Users	150	300	600	900	1200	1800	2400	3000
ifsappamdatapump -- IFS AM Data Pump	0	0	0	0	0	0	0	0
ifsappamm -- IFS Cloud Monitoring	1	1	1	1	1	1	1	1
ifsappamscheduler -- IFS AM Job Scheduler	1	1	1	1	1	1	1	1
ifsappamworkqueue -- IFS Redis Work Queue	2	2	2	2	2	2	2	2
ifsappapplicationsvc -- IFS Utility Applications	2	2	2	2	2	2	2	2
ifsappbusmod -- IFS Business Modeler Service.	0	0	0	0	0	0	0	0
ifsappchat -- ifsapp-chat	0	0	0	0	0	0	0	0
ifsappclient -- ifsapp-client	2	2	2	2	2	2	2	2
ifsappclientnotification -- ifsapp-client-notification	2	2	2	2	2	2	2	2
ifsappclientservices -- ifsapp-client-services	2	2	2	2	2	2	2	2
ifsappconnect -- IFS Connect.	2	2	2	2	2	2	2	2
ifsappdoc -- ifsapp-doc.	2	2	2	2	2	2	2	2
ifsappdocmanesign -- ifsapp-docman-esign	2	2	2	2	2	2	2	2
ifsappextensibility -- IFS Extensibility Applications	2	2	2	2	2	2	2	2
ifsappgraph -- IFS Graph Service.	0	0	0	0	0	0	0	0
ifsappiam -- ifsapp-iam	2	2	2	2	2	2	2	2
ifsappnativeexecutor -- IFS Arena Native Executor	2	2	2	2	2	2	2	2
ifsappnativenotification -- IFS Arena Native Notification	2	2	2	2	2	2	2	2
ifsappnativeserver -- IFS Arena Native Framework Server	2	2	2	2	2	2	2	2
ifsappodata -- ifsapp-odata	2	2	2	2	3	4	5	6
ifsapppowerbisvc -- IFS Power BI Service.	0	0	0	0	0	0	0	0
ifsappproxy -- ifsapp-proxy	2	2	2	2	3	3	4	4
ifsapprem -- IFS Remote Assistance Service.	0	0	0	0	0	0	0	0
ifsappreporting -- IFS Reporting	2	2	2	2	2	3	4	5
ifsappreportingbr -- IFS Business Reporter Rendering Service	2	2	2	2	2	2	2	2
ifsappreportingcr -- IFS Reporting Crystal Integration	0	0	0	0	0	0	0	0
ifsappreportingren -- IFS Reporting Rendering Service	2	2	2	2	2	3	4	5
ifsappreportingwebdesigner -- IFS Reporting Web Designer	2	2	2	2	2	2	2	2
ifsappreportingwebdesignerren -- IFS Reporting Web Designer Backend	2	2	2	2	2	2	2	2
ifsappreportingwebbruntimeren -- IFS Reporting Web Runtime Renderer	2	2	2	2	2	2	2	2
ifsappreportingwebtransformer -- IFS Reporting Web Transformer	2	2	2	2	2	2	2	2
ifsapprmpanel -- IFS CRM and SRM Panel	0	0	0	0	0	0	0	0
ifsapprmsync -- IFS CRM and SRM Calendar Sync	0	0	0	0	0	0	0	0
ifsappscim -- IFS Cross-Domain Identity Management	2	2	2	2	2	2	2	2
ifsappsigningservice -- IFS Cloud Signing Service	2	2	2	2	2	2	2	2
ifsfilestorage -- ifs-file-storage	0	0	0	0	0	0	0	0
ifsmaintenixappserver -- IFS Maintenix Application Server.	0	0	0	0	0	0	0	0
ifsmaintenixreportserver -- IFS Maintenix Report Server.	0	0	0	0	0	0	0	0
ifsvirusscanner -- ifs-virus-scanner	2	2	2	2	2	2	2	2

User load

The user load in the different user levels are as follows in table below.

Users	150	300	600	900	1200	1800	2400	3000
	Trans Per Hour Item	Trans Per Hour Item	Trans Per Hour Item	Trans Per Hour Item	Trans Per Hour Item	Trans Per Hour Item	Trans Per Hour Item	Trans Per Hour Item
Customer Orders	293	585	1170	1755	2340	3510	4680	5850
- Query Customers Order Lines	293	585	1170	1755	2340	3510	4680	5850
- Query Customer	293	585	1170	1755	2340	3510	4680	5850
- Query Inventory Part Current On Hand	293	585	1170	1755	2340	3510	4680	5850
Purchase Orders	210	420	840	1260	1680	2520	3360	4200
- Query Purchase Order Lines	210	420	840	1260	1680	2520	3360	4200
- Query Supplier for Purchase Parts	210	420	840	1260	1680	2520	3360	4200
- Query Purchase Parts	210	420	840	1260	1680	2520	3360	4200
Shop Order Requisition	8	15	30	45	60	90	120	150
Manual Vouchers	225	450	900	1350	1800	2700	3600	4500
- Query Supplier Analysis	225	450	900	1350	1800	2700	3600	4500
- Query Customer Invoices	225	450	900	1350	1800	2700	3600	4500
Connect inbound message	300	600	1200	1800	2400	3600	4800	6000
Order Report	75	150	300	450	600	900	1200	1500
Customer order reports indirectly from CO	878	1755	3510	5265	7020	10530	14040	17550

Network Bandwidth Usage

Backbone network

To ensure that the network will not be a limiting factor, Gigabit Ethernet or greater should be used in the server network backbone i.e., the network connections between IFS Servers.

With the current load the network would need a minimum of the following bandwidths for the current load of IFS Cloud Web users and connect messages.

Users	150	300	600	1200	1800	2400	3000
Bandwith mbps	10	20	35	65	100	130	160

Background

Hardware

The recommendations will provide calculated specifications figures based on the input you entered; this will guide you to suitable hardware. However, there are typically other configurations that also would be suitable. To choose the right one, the following aspects must be taken into consideration:

- How far does this server scale before it must be replaced? How many more CPUs can be added?
- Is there enough headroom to handle a possible increase of load in the future?
- What's the relationship between price and performance for each server model?

Use this guide with common sense and feel free to discuss all recommendation with your hardware vendor to get the most optimal solution. Always get the hardware vendors confirmation of configuration before making any purchase; especially check memory and CPU configuration if a future upgrade is desirable.

Software

When choosing OS on the server there should be made some consideration about the limitations that exists in the different versions as for example CPU and memory limitations.

All IFS Base Servers runs on Oracle database. Applicable for Remote operation model. IFS recommends using the latest available release update revision of the supported Oracle Database versions and using the Enterprise Edition. Editions supported are:

- Oracle 19c Standard Edition 2
- Oracle 19c Enterprise Edition

Note that Standard Edition 2 is limited to 2 CPU and max 16 threads and that must be taken into consideration when choosing server appropriately. Another reason to use Enterprise Edition would be to use the features only available with this version, but that is not a requirement for IFS Cloud.

To obtain a secure production runtime environment there are other products and licenses that should be considered. For example, if you are planning to use a third-party backup solution together with Oracle Recovery Manager this will need a special license. It is also recommended to purchase a license for Oracle Diagnostic pack to be able to use Oracle Automatic Workload Repository functionality to verify potential performance problems using Oracle Enterprise Manager.

There is also a strict certification guide “Technical Documentation for IFS Cloud - Supported Platforms” provided by IFS R&D to follow in accordance with IFS. This will be specific with each IFS version, and you must use the right versions and combinations of them.

User load

A comprehensive and flexible system like IFS Cloud can be used in a great number of different ways and each customer has a unique way of using the system. This fact makes it impossible to design a set of scenarios that covers all possible use cases; the best option is to select a relatively wide range of scenarios and to make sure those represent the most significant load due to high volumes are included.

We have made assumptions about the type of client and load imposed by users. The clients used in the guide are IFS Cloud Web Client users. Users are connected and working with IFS Applications during all day and are typically doing 5 tasks per hour.

These users can be considered as concurrent users which are a subset of the term “named users”. “Named users” refers to the highest possible number of users, how many of those users that are concurrently connected to the system vary from case to case. However concurrent doesn’t mean that the user will have an active transaction at the same time.

Server CPU requirements

To describe servers CPU requirement, we use SPECint® from SPEC® the Standard Performance Evaluation Corporation. These values are calculated from the workload and can then be used to select an appropriate server size.

The SPEC CPU® 2017 benchmark package contains SPEC's next-generation, industry-standardized, CPU intensive suites for measuring and comparing compute intensive performance, stressing a system's processor, memory subsystem and compiler.

The SPEC CPU 2017 benchmark package contains 43 benchmarks, organized into four suites:

- **The SPECspeed® 2017 Integer and SPECspeed® 2017 Floating Point suites are used for comparing time for a computer to complete single tasks.**
- **The SPECrate® 2017 Integer and SPECrate® 2017 Floating Point suites measure the throughput or work per unit of time.**

Minimum requirements

All calculations and recommendations are done for IFS Applications only, which means that CPU, memory, disk and network resources must be added extra for server, OS and other applications where not specifically otherwise is stated.

User scenarios

Perhaps the most important and delicate task when planning a performance test is to decide which tasks to test. A comprehensive and flexible system like IFS Applications can be used in a great number of different ways and each customer has a unique way of using the system.

This fact makes it impossible to design a set of scenarios that covers all possible use cases; the best option is to select a relatively wide range of tasks and to make sure those imposing the most significant load due to high volumes are included.

The tasks used have been discussed with application managers, technical managers and specialists of IFS R&D and they are described in detail in this document. These tasks are representative for the majority of cases when a number of IFS Applications components are used, but probably not an “exact match” for anyone.

One notable difference compared to how some tasks are executed in reality are that we tend to perform all actions connected to for example a customer order in a sequence by a single user, instead of splitting the job among several users over a longer time period.

This simplification is introduced only to enable us to monitor and verify the results of potentially thousands of users. This simplification does not in any way change the amount of load the task imposes on the server.

The tasks in this paper cover the IFS Cloud Web Client.

Scenarios

Scenario tasks - Supply Chain Customer Order

- Create Customer Order
- Query Customers Order Lines
- Query Customer
- Query Inventory Part Current On Hand

Scenario tasks - Supply Chain Purchase Order

- Create Purchase Order
- Register Purchase Order Arrivals
- Purchase Order, move into stock
- Query Overview - Purchase Order Lines
- Query Overview - Supplier for Purchase Part
- Query Part Catalog

Scenario tasks - Manufacturing Shop Order

- Create Shop Order Requisition

Scenario tasks - Financials

- Voucher Entry
- Query Overview – Suppliers
- Query Overview - Customer Invoices

Scenario tasks – Reporting

- Order Report

Scenario tasks – Connect

- 1/3 - Inbound – Small [25KB]
- 1/3 - Inbound – Medium [250KB]

- 1/3 - Inbound – Large [2500KB]

Test Data

To achieve highest possible realism for the test, IFS R&D have created a database that is based on the demo database “race” but is extended with some considerable amount of basic, runtime and historical data for all the scenarios being used. The total size of this database (tables and indexes) is approximately 120GB.

All areas of interest (pertaining to the scenarios described in this document) have large quantities of data created with the internal IFS Application business logic which ensures that all the data is consistent and distributed in a realistic manner. The following provide examples of the volumes of data that this database has in some scenario areas.

- 15000 users
- 5000 customers
- 560,000 customer orders
- 7,000,000 historical customer orders
- 7,000,000 historical customer order lines
- 220,000 purchase parts
- 300,000 purchase orders
- 1,500,000 historical purchase orders
- 4,900,000 historical purchase order lines
- 400,000 inventory parts
- 600,000 invoices

Testing methodology

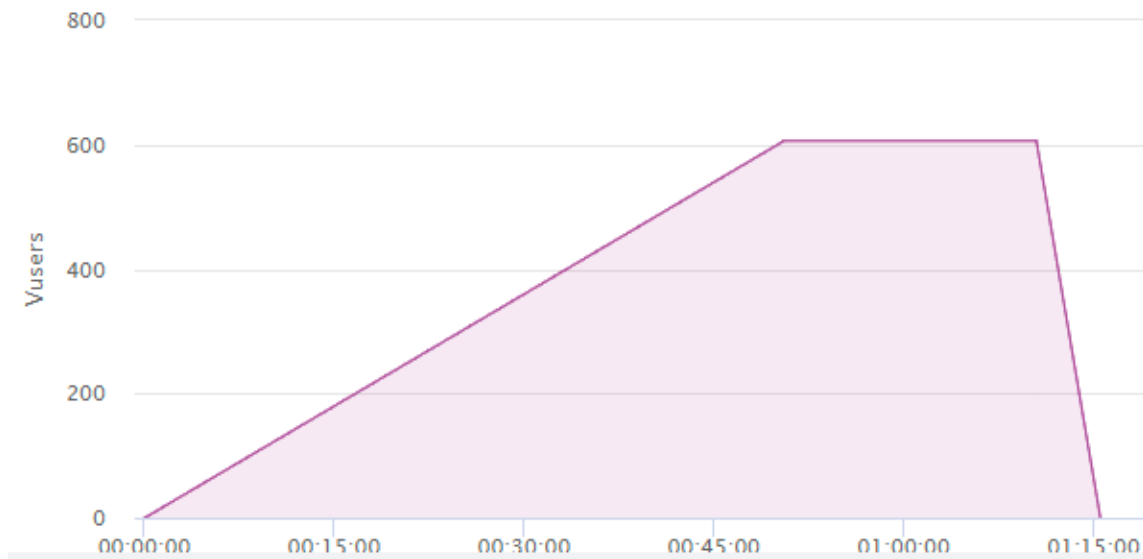
Test Tool

For all testing the software LoadRunner Enterprise from Micro Focus has been used as a loading tool. LoadRunner is a software testing tool designed to measure and analyse the performance and behaviour of software applications and systems under different load conditions.

The overall methodology in tests done are that we have the different user groups containing the different tasks with a distribution in percent, that will place users from the total amount into those groups.

ISG		606		16	
Group Name	Script Name	Script Type	Vusers-100%	# of LG	
cloud24r1ea_aurena_co_customerorder	Cloud24R1EA_Aurena_CO_CustomerOrder	Web - HTTP/HTML	39	16	
cloud24r1ea_aurena_fin_voucher	Cloud24R1EA_Aurena_FIN_Voucher	Web - HTTP/HTML	30	16	
cloud24r1ea_aurena_po_purchaseorder	Cloud24R1EA_Aurena_PO_PurchaseOrder	Web - HTTP/HTML	28	16	
cloud24r1ea_aurena_reportcustomeragreement	Cloud24R1EA_Aurena_ReportCustomerAgreement	Web - HTTP/HTML	1	16	
cloud24r1ea_aurena_so_shoporder	Cloud24R1EA_Aurena_SO_ShopOrder	Web - HTTP/HTML	1	16	
cloud24r1ea_connect_inbound	Cloud24R1EA_Connect_Inbound	Web - HTTP/HTML	1	16	

Running schedule of the test is starting users one by one and each user doing their task repeatedly and after all users has started there is a period where they all run together, and it is during this period statistics around resources, responses and validation of correct data is created.



Tests that have been done has always the corresponding numbers of end-users logged in.

Sizing guide versions

Different versions of sizing guide have used different types of measurement to make relation between load and recommendations, therefor it is not necessarily possible to compare values between different versions of the guide.