

EXHIBIT A · PRO.FILE 10.5

Turnkey PLM System Hardware Guide

Server infrastructure, sizing and architecture recommendations for a fast, stable and secure PRO.FILE 10.5 PLM deployment.

Sizing for 0–200+ users

10.5 architecture

Dedicated Dynamic Search

CPU & storage best practice

Cloud & hybrid topologies

WELCOME

Built for speed from day one

The hardware you provision before installation day decides how PRO.FILE feels to every engineer, every day. This guide gives your IT team the server specifications, the architecture and the field-proven tuning advice that our implementations rely on.

CLOCK SPEED

≥ 3 GHz

Fast cores beat many cores. Target 3.5 GHz or more.

VCPU LAYOUT

2 sockets

Spread vCPUs across two virtual sockets (e.g. 2 × 2).

STORAGE

NVMe SSD

Matched to workload: read, write and mixed-use drives.

SECURITY

HTTPS

SSL is required in 10.5 for Dynamic Search and SSO.

What is inside

01 PRO.FILE 10.5 architecture

Every server role, how they talk to each other, and what changed in 10.5.

02 Performance principles

CPU, virtual-machine and storage guidance from the PRO.FILE product team.

03 Sizing by concurrent users

Production and test specifications for 0–100, 100–200 and 200+ concurrent users.

04 Dynamic Search server

Why production gets its own search server, and what it needs.

05 Deployment topologies

All-cloud and hybrid layouts with on-site vault and NDF processing.

06 Software, licensing & operations

What you license, plus antivirus, backup and maintenance rules that keep PLM fast.

HOW TO USE THIS GUIDE

Pick the tier that matches your **concurrent** users (people working in PRO.FILE at the same moment, not named accounts), provision the servers listed for it, then work through **Exhibit B, the IT Prerequisites Checklist**. It covers firewall ports, SSL certificates, the SMTP mail relay, single sign-on and the values your IT team returns to Cre8tive before installation.

PRO.FILE 10.5 at a glance

In PRO.FILE 10 every client talks to one place: the PRO.FX AppServer. The AppServer talks to the database, the vault and, new in 10.5, the Dynamic Search services.

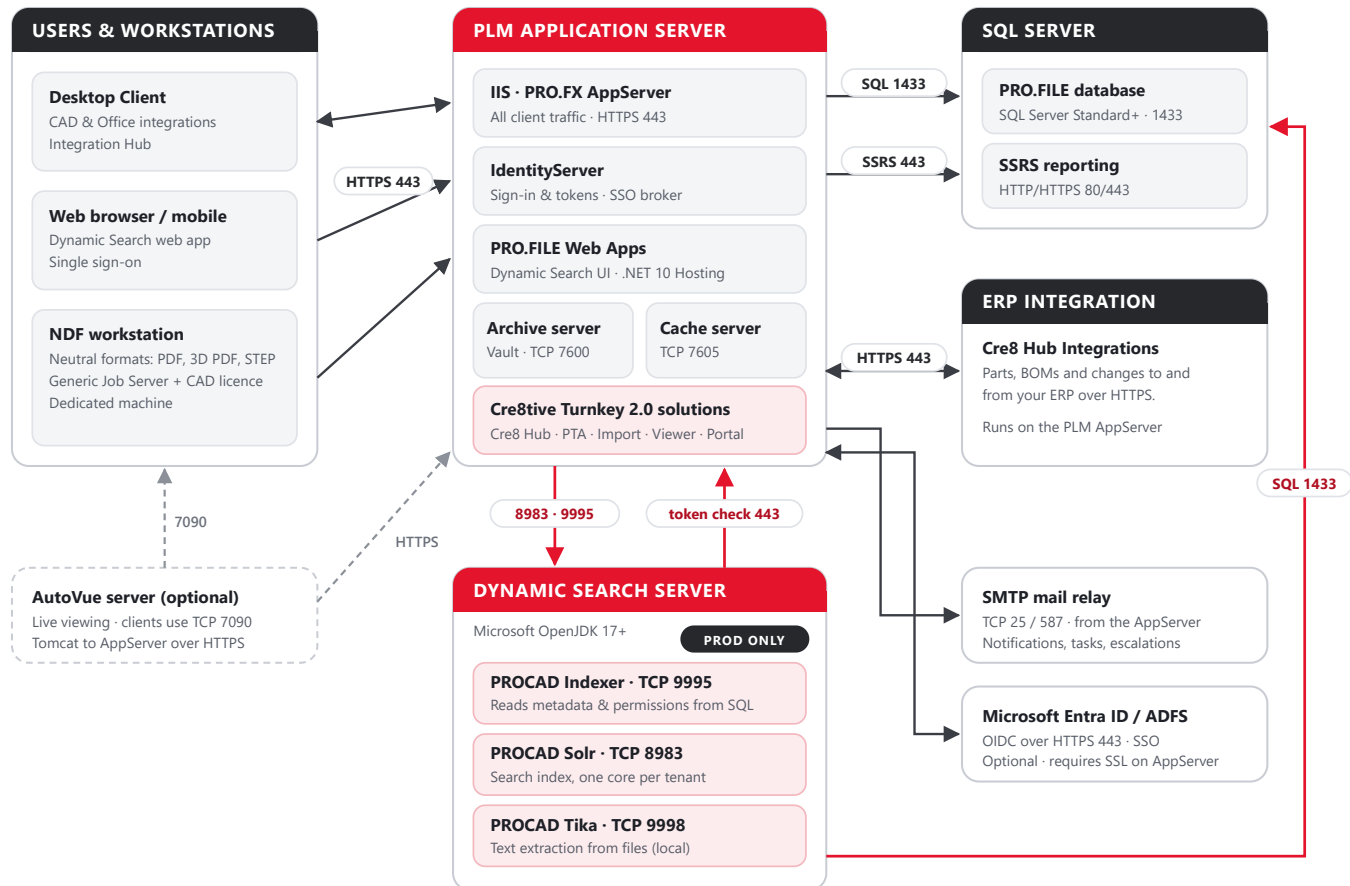


Figure 1 — PRO.FILE 10.5 components and network paths. Red paths are new in 10.5. Port details and firewall rules are listed in Exhibit B.

NEW · DYNAMIC SEARCH

Three new Windows services (Indexer, Solr, Tika) provide full-text and faceted search. In production they get their own server.

NEW · IDENTITYSERVER

Sign-in runs through the IdentityServer at `/procad/identityserver`. It also brokers single sign-on with Entra ID or ADFS.

REQUIRED · HTTPS

SSL on the AppServer is strongly recommended in 10.4 and required in 10.5 for Dynamic Search, the web apps and SSO.

Server roles

Each role below maps to a machine in the sizing tables. In smaller systems some roles share a server; the sizing pages show where.

PLM APPLICATION SERVER **CORE**

Hosts the PRO.FX AppServer in IIS, the IdentityServer, the PRO.FILE Web Apps and the **Cre8tive Turnkey 2.0 solutions**. It is also the **Archive (vault) and Cache server**: every file saved into PLM is stored and delivered here.

Turnkey 2.0: Cre8 Hub (incl. ERP integrations), Process Task Automation, Import Tool, Document Viewer, Problem Reporting Portal and the Turnkey Extension Library.

SQL DATABASE SERVER **CORE**

Hosts the SQL Server instance for the PRO.FILE database and the SQL Server Reporting Services (SSRS) instance. It stores the PLM database and answers every query and transaction the AppServer makes.

Microsoft SQL Server **Standard or higher**, licensed by the customer. SQL Server hosted in Azure must also carry Microsoft Software Assurance.

ERP INTEGRATION: CRE8 HUB **OPTIONAL**

Cre8 Hub Integrations move parts, BOMs and engineering changes between PRO.FILE and your ERP system. Cre8 Hub is part of the Turnkey 2.0 platform and runs as a web application on the PLM Application Server, talking to your ERP over HTTPS.

No separate integration server or integration licence is needed.

NDF WORKSTATION **OPTIONAL**

Watches PRO.FILE against a set of configuration rules and converts matching documents into neutral formats (PDF, 3D PDF, STEP and others) for the shop floor and external partners.

A dedicated machine used for nothing else. NDF services run as a local user. Size it to at least the CAD vendor's minimum spec; it needs **one dedicated CAD licence**.

DYNAMIC SEARCH SERVER **NEW IN 10.5**

Runs the three Dynamic Search services: **Indexer** (coordination), **Solr** (search index) and **Tika** (text extraction). Users get fast, faceted full-text search across metadata and file contents from the Desktop Client or any browser.

Production: a dedicated server. Test: co-hosted on the test AppServer. See chapter 04.

SUPPORTING SERVICES

- **SMTP mail relay**: task, process, escalation and job-server e-mails.
- **Microsoft Entra ID or ADFS**: optional single sign-on.
- **AutoVue server**: optional live viewing. AutoVue Desktop is not supported in PRO.FILE 10.
- **ETOR replication**: multi-site systems only.

MULTI-SITE NOTE

In PRO.FILE 10 a remote site with only a file/cache server and no database does **not** perform well, because every client works through the AppServer. Remote sites either connect directly to the central system over a good link, or use ETOR replication. For ETOR sites we recommend full PushRep in both directions; it also gives you a live off-site copy for disaster recovery.

Fast cores, close servers, the right disks

This guidance reflects Revalize best practices for PRO.FILE and is provided in cooperation with Revalize. The fastest PRO.FILE systems we run all follow it.

1 CPU: clock speed matters more than core count

PRO.FILE's AppServer and SQL workloads reward **high per-core frequency** far more than extra cores. A server with 2.5 GHz cores and a high core count will feel **slower** to users than one with fewer cores at 3.5–4 GHz, even though the core-count arithmetic suggests the opposite.

- **Minimum:** 3.0 GHz sustained base clock on every PLM server.
- **Preferred:** 3.5 GHz or higher. Our fastest customer systems run at 4 GHz.
- **Do not** try to make up for a low clock speed by adding cores.

RULE OF THUMB

When choosing between CPU models, pick the **higher-frequency part** with the core count from the sizing tables, not the part with the most cores.

2 Virtual machines: two sockets

About 90% of PLM servers are virtual. When you create the VM, **split the vCPUs across two virtual sockets** rather than one socket with many cores. For a 4-vCPU server use **2 sockets × 2 cores per socket**. In practice this layout is much more likely to be scheduled onto physical cores, and those are clearly faster. Keep the two-socket layout as the vCPU count grows.

VCPUS IN SIZING TABLE	VIRTUAL SOCKETS	CORES PER SOCKET
4	2	2
8	2	4
16	2	8

Reserve vCPU and memory for the PLM VMs where your hypervisor allows it, and avoid over-committing the host.

3 Storage: NVMe SSD, matched to the workload

Use **NVMe SSD** wherever possible. On SAN storage, the link between the VM host and the SAN must be fast. Ask your storage team about it explicitly. For the best results, use drive types that suit each workload:

VOLUME	SERVER	RECOMMENDED SSD CLASS	WHY
SQL data files (.mdf)	SQL	RI Read-intensive	Mostly reads: searches, forms, structures.
SQL log files (.ldf)	SQL	WI Write-intensive	Constant sequential writes.
Vault (prodata)	AppServer	MU Mixed-use	Check-ins and check-outs in equal measure.
Solr index	Dynamic Search	MU Mixed-use, fast SSD	Indexing writes, search reads.

Keep SQL data and transaction logs on **separate volumes**, never on the system drive. From about 150 users, put them on physically separate volumes so reads and writes run in parallel.

4 Location and network

- **All PLM servers in one location:** AppServer, SQL, vault and Dynamic Search in the same data centre or cloud region, with minimal latency between them.
- Tell us about **firewalls, VLANs and subnets** between servers in advance. Each one is a rule that must exist before installation day.

5 SQL Server settings

- **Cap SQL Server memory:** 75% of RAM on physical servers, 66% on virtual servers. On VMs, set minimum and maximum server memory to the same value.
- **Exclude CPU 0** from SQL Server processor affinity so the operating system always has headroom.
- Collation `Latin1_General_CI_AS` (accent-sensitive), mixed-mode authentication, SQL Client Connectivity SDK installed.

Sizing at a glance

Sizing follows **concurrent active users**: the people working in PRO.FILE at the same moment. After go-live you can read the live figure on the AppServer status page.

PRODUCTION SERVER	0–100 USERS	100–200 USERS	200+ USERS
PLM Application Server	8 vCPU · 32 GB · 1 TB vault	8 vCPU · 64 GB · 1 TB vault	16 vCPU · 128 GB · 2 TB vault
SQL Server	4 vCPU · 16 GB · 500 GB DB	4 vCPU · 32 GB · 1 TB DB	8 vCPU · 64 GB · 1 TB DB
Dynamic Search 10.5	4 vCPU · 32 GB · 300 GB index	4 vCPU · 32 GB · 300 GB index	8 vCPU · 64 GB · 300 GB index
NDF Workstation	4 cores · 16 GB · 250 GB	4 cores · 16 GB · 250 GB	4 cores · 16 GB · 250 GB

All vCPU counts assume ≥ 3.0 GHz cores (3.5 GHz+ preferred) in a two-socket VM layout. Disk sizes are starting points. Size the vault and the database for your current data plus at least three years of growth.

PRODUCTION

Separate AppServer, SQL and Dynamic Search servers. This is the layout the tables describe.

TEST **UP TO 10 USERS**

A smaller copy for upgrades, configuration and acceptance testing. Dynamic Search is co-hosted on the test AppServer.

ABOVE 50 USERS

Cre8tive applies the PRO.FILE large-installation tuning (admin tenant, service-bus and watchdog settings). See chapter 06.

MAIN, TEST AND ADDITIONAL SYSTEMS

The **Main system** is installed first on the production hardware, used for implementation and training, then cleaned of non-production data at go-live to become Production. The **Test system** runs on separate, isolated hardware and is deployed at go-live from a clean copy of Production; every update, OS or SQL patch, CAD change and Dynamic Search schema change is proven there first. **DEV, PILOT or TRAINING** systems run as separate databases and vaults on the Main or Test servers. Test and additional systems may need extra licensing and effort.

TIER 1

0–100**Concurrent active users**

Typical for single-site engineering organisations

PRODUCTION environment

	PLM APPLICATION SERVER	SQL SERVER	DYNAMIC SEARCH SERVER	NDF WORKSTATION
Operating system	Windows Server 2022 / 2025	Windows Server 2022 / 2025 SQL Server 2019 / 2022 Std+	Windows Server 2022 / 2025	Windows 11 Pro
CPU	8 vCPU 2 sockets × 4 · ≥3 GHz	4 vCPU 2 sockets × 2 · ≥3 GHz	4 vCPU 2 sockets × 2 · ≥3 GHz	4 cores CAD vendor min. or better
Memory	32 GB	16 GB	32 GB	16 GB
Disk 1 · OS	120 GB	120 GB	120 GB	250 GB OS / data
Disk 2	Vault 1 TB MU SSD	Database 500 GB RI SSD	Solr index 300 GB fast SSD	—
Disk 3	Installs 60 GB optional	Log / backup 500 GB WI SSD	—	—

TEST environment (up to 10 users)

	PLM APP SERVER + DYNAMIC SEARCH	SQL SERVER	NDF WORKSTATION
Operating system	Windows Server 2022 / 2025	Windows Server 2022 / 2025 SQL Server 2019 / 2022 Std+	Windows 11 Pro
CPU	4 vCPU 2 sockets × 2 · ≥3 GHz	4 vCPU 2 sockets × 2	4 cores
Memory	32 GB 16 GB AppServer + 16 GB Dynamic Search	16 GB	16 GB
Disk 1 · OS	120 GB	120 GB	250 GB OS / data
Disk 2	Vault 1 TB	Database 500 GB	—
Disk 3	Solr index 250 GB SSD	Log / backup 500 GB	—

Windows 10 reached end of support in October 2025, so NDF workstations are specified on Windows 11. Confirm OS and SQL versions against the current Revalize Product Release Matrix for your service pack.

TIER 2

100–200**Concurrent active users**

Large-installation tuning applies at this size

PRODUCTION environment

	PLM APPLICATION SERVER	SQL SERVER	DYNAMIC SEARCH SERVER	NDF WORKSTATION
Operating system	Windows Server 2022 / 2025	Windows Server 2022 / 2025 SQL Server 2019 / 2022 Std+	Windows Server 2022 / 2025	Windows 11 Pro
CPU	8 vCPU 2 sockets × 4 · ≥3 GHz	4 vCPU 2 sockets × 2 · ≥3 GHz	4 vCPU 2 sockets × 2 · ≥3 GHz	4 cores CAD vendor min. or better
Memory	64 GB	32 GB	32 GB	16 GB
Disk 1 · OS	120 GB	120 GB	120 GB	250 GB OS / data
Disk 2	Vault 1 TB MU SSD	Database 1 TB RI SSD	Solr index 300 GB fast SSD	—
Disk 3	Installs 60 GB optional	Log / backup 500 GB WI SSD, separate volume	—	—

TEST environment (up to 10 users)

	PLM APP SERVER + DYNAMIC SEARCH	SQL SERVER	NDF WORKSTATION
Operating system	Windows Server 2022 / 2025	Windows Server 2022 / 2025 SQL Server 2019 / 2022 Std+	Windows 11 Pro
CPU	4 vCPU 2 sockets × 2 · ≥3 GHz	4 vCPU 2 sockets × 2	4 cores
Memory	32 GB 16 GB AppServer + 16 GB Dynamic Search	16 GB	16 GB
Disk 1 · OS	120 GB	120 GB	250 GB OS / data
Disk 2	Vault 1 TB	Database 1 TB	—
Disk 3	Solr index 250 GB SSD	Log / backup 500 GB	—

AT THIS SIZE

Changes in the ISI.CONTROL Panel make every connected client reload its configuration at once. Cre8tive sets up a separate **admin tenant** for configuration work and tunes the service-bus and watchdog settings so the AppServer stays responsive. See chapter 06.

TIER 3

200+**Concurrent active users**

Enterprise and multi-site deployments · sized with Cre8tive

PRODUCTION environment

	PLM APPLICATION SERVER	SQL SERVER	DYNAMIC SEARCH SERVER	NDF WORKSTATION
Operating system	Windows Server 2022 / 2025	Windows Server 2022 / 2025 SQL Server 2019 / 2022 Std+	Windows Server 2022 / 2025	Windows 11 Pro
CPU	16 vCPU 2 sockets × 8 · ≥3 GHz	8 vCPU 2 sockets × 4 · ≥3 GHz	8 vCPU 2 sockets × 4 · ≥3 GHz	4 cores CAD vendor min. or better
Memory	128 GB	64 GB	64 GB	16 GB
Disk 1 · OS	120 GB	120 GB	120 GB	250 GB OS / data
Disk 2	Vault 2 TB MU SSD	Database 1 TB RI SSD	Solr index 300 GB fast SSD	—
Disk 3	Installs 60 GB optional	Log / backup 500 GB WI SSD, separate volume	—	—

TEST environment (up to 10 users)

	PLM APP SERVER + DYNAMIC SEARCH	SQL SERVER	NDF WORKSTATION
Operating system	Windows Server 2022 / 2025	Windows Server 2022 / 2025 SQL Server 2019 / 2022 Std+	Windows 11 Pro
CPU	4 vCPU 2 sockets × 2 · ≥3 GHz	4 vCPU 2 sockets × 2	4 cores
Memory	32 GB 16 GB AppServer + 16 GB Dynamic Search	16 GB	16 GB
Disk 1 · OS	120 GB	120 GB	250 GB OS / data
Disk 2	Vault 1 TB	Database 1 TB	—
Disk 3	Solr index 250 GB SSD	Log / backup 500 GB	—

PLAN WITH US

Above 200 concurrent users, or with more than one site, the final design depends on your data volume, CAD mix and ERP traffic. Treat these figures as the floor and let Cre8tive review the design with your infrastructure team before you order hardware. Adding cores is not a fix for slow cores.

A dedicated server for search

PRO.FILE 10.5 adds Dynamic Search: Google-style, faceted search across metadata and file contents, available in the Desktop Client and in any browser, including tablets and phones.

Why production gets its own server

Indexing is heavy work. The Indexer reads metadata and permissions from the database, sends every file to Tika for text extraction and feeds the results into Solr. The initial full index of an existing vault can run for hours or days.

On a shared server that work competes with the AppServer for the same CPU, memory and disk, and users feel it. The PRO.FILE product team **recommends installing Dynamic Search on a separate computer** so the AppServer is not affected. In production, Cre8tive installs it on a dedicated server by default.

ENVIRONMENT DYNAMIC SEARCH PLACEMENT

PRODUCTION

Dedicated Dynamic Search server, same location as the AppServer

TEST

Co-hosted on the test AppServer (localhost, no extra firewall rules)

MINIMUM SERVER REQUIREMENTS

CPU	4 cores or more, ≥ 3 GHz
Memory	16 GB minimum; 32 GB or more recommended
Index disk	Fast SSD, 300 GB (monitor growth as the index fills)
OS	Windows Server (or Windows 11)
Runtime	.NET Framework 4.8; Microsoft OpenJDK 17 or later

ALSO REQUIRED ON THE APPSERVER

- **HTTPS / SSL** on the AppServer site. Browsers block the Dynamic Search web app over plain HTTP.
- **PRO.FILE Web Apps** setup (Dynamic Search feature).
- **.NET 10 Hosting Bundle**, installed *after* IIS.

The three services

INDEXER · 9995

Coordinates indexing. Takes requests from the AppServer, reads metadata and access rights from SQL, sends files to Tika and feeds finished documents to Solr.

SOLR · 8983

The search index (Apache Solr). One index (core) per PRO.FILE tenant. Answers the AppServer's search queries.

TIKA · 9998

Text extraction (Apache Tika) from PDF, Office and other files. Called by the Indexer only, on the local machine.

NETWORK FOR A SEPARATE SERVER

AppServer → Dynamic Search server on TCP **8983** (Solr) and **9995** (Indexer). Dynamic Search server → SQL Server on the SQL port (1433), and → IdentityServer on the AppServer over **HTTPS 443**. Nothing else should be allowed to reach these services. The complete rule set and the configuration values Cre8tive needs are in Exhibit B.

We normally enable all three PRO.FILE search methods: metadata search, Windows full-text file search and Dynamic Search. Each serves different users, and switching one off later is quick.

On-premises, cloud or hybrid

PRO.FILE runs equally well in your data centre or in Azure/AWS, as long as the core servers sit together. These are the three layouts we deploy most often. Site and cloud are joined by a site-to-site VPN; remote users connect by VPN client.

A · ALL SERVERS IN THE CLOUD

CLOUD

PLM App / Vault

PRO.FILE AppServer, archive & cache server

CLOUD

SQL Server

PRO.FILE database, SSRS

CLOUD

Dynamic Search

Indexer, Solr, Tika (production)

CLOUD

NDF processing

Desktop Client, Integration Hub, CAD, Office

Simplest to run. Workstations and laptops reach the cloud through the VPN gateway. The ERP stays wherever it lives today.

B · SQL AND APPLICATION IN THE CLOUD, NDF AND VAULT ON-SITE

CLOUD

PLM Application

PRO.FILE AppServer

CLOUD

SQL Server

PRO.FILE database, SSRS

ON-SITE

PLM Vault

Archive / cache server · 4 vCPU, 32 GB, 1 TB vault

ON-SITE

NDF processing

Close to CAD users and licence server

Keeps large CAD files local to the engineers. Place the Dynamic Search server next to the AppServer and SQL in the cloud.

C · ALL SERVERS IN THE CLOUD, WITH AN ON-SITE VAULT AS A REDUNDANT ARCHIVE

CLOUD

PLM App / Vault

Primary archive & cache

CLOUD

SQL Server

PRO.FILE database, SSRS

ON-SITE

PLM Vault

Load-balancing / redundant archive

ON-SITE

NDF processing

Local neutral-format generation

Adds a second copy of the vault on your premises for resilience and fast local file access.

TOPOLOGY SERVER (TYPICAL 100–200 USERS)	SPECIFICATION	APPLICATIONS
PLM Application / Vault	8 vCPU, 64 GB RAM, OS 120 GB, vault 1 TB, installs 60 GB	PRO.FILE PLM, vault, Cre8 Hub
PLM Application (no vault)	8 vCPU, 64 GB RAM, OS 120 GB, installs 60 GB	PRO.FILE PLM, Cre8 Hub
PLM Vault (separate)	4 vCPU, 32 GB RAM, OS 120 GB, vault 1 TB	Archive / cache server
SQL Server	4 vCPU, 32 GB RAM, OS 120 GB, DB 1 TB, log 500 GB	SQL Server, SSRS
Dynamic Search	4 vCPU, 32 GB RAM, OS 120 GB, index 300 GB SSD	Indexer, Solr, Tika
NDF Processing	4 cores, 16 GB RAM, OS 150 GB, CAD vendor recommendation	Desktop Client, Integration Hub, CAD, Office

Keeping PLM fast after go-live

The hardware is half the story. These are the operating rules behind the PRO.FILE systems that stay fast for years.

Customer-provided software & licences

ITEM	NOTES
Windows Server	2022 or 2025 per the Revalize Product Release Matrix, with CALs for PLM users.
Microsoft SQL Server	Standard edition or higher, with Reporting Services (SSRS) and SQL Server Management Studio. Azure-hosted SQL requires Software Assurance.
ERP integration	Included: Cre8 Hub Integrations run on the PLM Application Server. No separate integration server to license.
CAD licence for NDF	One licence dedicated to the NDF workstation for each CAD system it processes (SolidWorks, Inventor, Creo, CATIA, NX, Solid Edge).
SSL certificate(s)	Issued by your CA for the AppServer's DNS name. Required in 10.5. See Exhibit B, section D.
Free runtimes	.NET Framework 4.8, .NET 10 Desktop Runtime & Hosting Bundle, Microsoft OpenJDK 17+. Cre8tive installs these with the PLM software.

Antivirus

- **Do not scan twice.** Files are scanned on the workstation, so do not scan them again on access on the server.
- Scan the vault (`prodata`) on a **nightly schedule**, not on access.
- **Exclude files that cannot be scanned:** SQL data and log files (`.mdf` , `.ldf`) and the Solr index.
- Run **one** antivirus product. If you use a third-party product, uninstall Windows Defender rather than relying on it being switched off.
- When we troubleshoot performance, we may ask for antivirus to be *uninstalled* briefly. Disabling it does not always prove anything.

Backup & maintenance

- **A SQL maintenance plan is mandatory:** index and statistics maintenance plus integrity checks. Without it, PRO.FILE gets slower every week.
- Keep a **PLM-owned database backup** (full, *copy-only* if a central backup tool is also used). Don't rely only on central snapshot tools.
- For systems up to about 500 users, use full backups in the **simple recovery model** rather than transaction-log backups.
- Back up the database and the vault together so they stay consistent. In ETOR systems, stop ETOR for the backup.

Large-installation tuning (50+ concurrent users) CRE8TIVE CONFIGURES

SETTING	WHAT IT DOES
Admin tenant	Administrators make ISI.CONTROL Panel changes in a separate tenant, so all users' clients do not reload the configuration at once during working hours.
Daily AppServer recycle	A scheduled nightly recycle applies form and form-script changes and keeps the AppServer fresh.

SETTING	WHAT IT DOES
Service-bus scope	Limits live field-refresh events to the user who made the change, removing constant CPU and network load on the AppServer.
Watchdog interval	For ETOR or multi-AppServer systems only: 300 seconds instead of the 30-second default.
Logging	<code>ClientSessionsOnly</code> with debug detail: full traces on demand, no constant logging overhead.
SQL Query Store	Enabled for one to two weeks after go-live to find missing indexes with minimal overhead.

NEXT STEP

Provision the servers for your tier, then complete **Exhibit B, the IT Prerequisites Checklist**, and return it to your Cre8tive project lead. It lists every service account, firewall rule, certificate, e-mail and single sign-on value we need, so installation day is spent installing.



Cre8tive Technology & Design

Guidance is provided in consideration of all Revalize best practices and in cooperation with Revalize. Specifications are confirmed per project against the Revalize Product Release Matrix.