Best Practices Guide

Lina 5.3

This guide contains best practices concerning Lina sizing and security

Contents

1. Overall presentation of Lina

Lina is a backup solution dedicated to the protection of **remote sites and offices**, **desktops**, **laptops and file servers**.

Lina offers continuous backup of Windows, Linux, macOS or Synology machines.

Lina is based on the Atempo Deduplication Engine which optimizes network traffic and block storage. In order to obtain secure and efficient backup, deduplication, and restore services, it is recommended to follow the best practices contained in this document.

2. Server Component Installation

2.1. Operating System

Lina Server component can be installed indifferently on Linux or Windows with the same set of features on both. For backup security reasons, we encourage you to choose the Linux version, because this operating system is less sensitive to viruses and other ransomware. On Windows, we advise you not to include it in the Active Directory domain in order to avoid the possibility that an infected AD could also lead to the removal of the backup data.

2.2. Software Components

Lina Server is composed of the following elements:

- The Lina **server binaries** including the web server used for the administration console as well as for the exchanges with the agents

- The **agents databases**: Lina creates a database for each backed up agent, on the server. The databases are stored in the path specified in the configurator. These databases are accessed very frequently and with random accesses, so it is recommended to store them on a dedicated SSD disk.

- The **block indexing database** of the ADE deduplication engine, based on RocksDB.
  - This database is used to index deduplicated data blocks
  - Access to this database requires low latencies, so it is recommended to install it on a dedicated SSD disk.

- The **block repository** which holds the backup data in the form of deduplicated blocks. Access to the blocks is sequential for writing but random for reading. It is therefore recommended to choose capacitive disks in RAID with enough axes to parallelize the input/output.

2.3. Block Storage

We recommended implementing a physical server associated with block storage (SAS, DAS, FC, iSCSI) preferably in direct attachment to ensure the availability of the backup service. However, the storage of backup blocks can also be put on file shares such as CIFS/SMB or NFS. Beware, CIFS/SMB is a protocol that is particularly exposed to ransomware attacks. In this case, you must ensure that the share is only accessible from the backup server.

We recommend the use of RAID 6 or equivalent for the storage of backup blocks because the reconstruction of capacitive disks can take several days depending on the capacity of the disks and therefore increases the risk of double failure.

Depending on the OS and file systems, it is not always possible to create a single partition of the desired size. But it is possible to define several destination folders via the variable "repository.path" in the Configurator interface. In Linux configuration it is recommended to store the blocks on a journaled file system, such as EXT4.

2.4. Estimated Backup Volume

The sizing of the backup server is based on the number of client workstations connected to the server and the overall volume of blocks after deduplication.

In order to estimate the volume of blocks, the average volume to be protected per workstation (or file servers), the number of workstations and the retention time must be taken into consideration. Note that it is possible to define a quota of protected volume, to limit the volume backed up on each workstation.

Note: The protected volume for each workstation is indicated in the administration interface as well as in each agent interface.

The deduplication is global on the whole protected park, a block can thus be requested several times for the restitution of a file, for various files and various machines.

The deduplication ratio obtained depends mainly on the nature of the data (compressed files, encrypted files, images, videos, etc.) and varies greatly from one installation to another.

Based on the analysis of our installed base, we recommend to allocate at least 75% of the global volume to be protected in capacitive disk space to accommodate the deduplicated blocks. It is important to note that Lina is scalable, adding additional disk space for block storage as well as for agent databases is done in a few clicks in the Configurator.

For instance, for 400 machines with each 30GB to back up, and a 30 day retention, you need 400 x 30 x 75% = 9 000 GB of usable volume.

You should opt for a configuration of 6 SATA 3TB disks in RAID 6 offering 10 800 GB of usable disk space. Be careful to always provide enough space for the proper functioning of the file system (NTFS, EXT4).

2.5. SSD Basics

There are several categories of SSD disks:

- **Read-intensive** : disks guaranteed for less than one full write of the disk volume per day (Drive Write Per-Day).

- **Mixed-use** : disk guaranteed for about 3 full writes per day.

- **Write-intensive**: disk guaranteed for about 10 full writes per day.

To avoid premature wear and tear of SSDs, it is recommended to choose Mixed-use SSDs or to double the required disk volume (to double the lifetime) on Read-intensive drives. This is taken into account in the sizing table below.

2.6. Sizing

We have classified Lina servers in 6 recommended configurations, depending on the volume and the number of workstations to be backed up:

Recommended Configuration	Description	Core	Memory (GB)	DB Size (GB)	SSD
C0	Volume < 5 TB Less than 100 agents	2	8	64	Non mandatory
C1	Volume < 10 TB Less than 250 agents	4	16	256	SAS Mixed-use
C2	Volume < 25 TB Less than 500 agents	8	32	512	SAS Mixed-use
C3	Volume < 50 TB Less than 1000 agents	12	64	800	SAS Mixed-use
C4	Volume < 75 TB Less than 1500 agents	16	96	1024	SAS Mixed-use
C5	Volume < 100 TB Up to 2000 agents	20	128	1200	SAS Mixed-use

Note: Lina servers can be virtualized provided that the requested configuration is respected. In case of performance issues, support may request full reservation of processor and memory resources.

Backups to disk are split into blocks at the source allowing for block incremental backup and disk storage optimization. The block size is 256 KB and blocks are stored on the server in 32 GB files by default.

As of version 5.3, a Lina server can handle up to 100 TB of deduplicated blocks. To handle larger volumes, you will need to deploy multiple Lina servers. It is possible to put up to 3 Lina server instances on the same machine, provided that the resources needed for each instance are taken into account.

2.7. Examples of recommanded configurations

C0 Server Configuration :

To secure up to 100 agents or 5 TB of blocks

- Bi-Core 64-bit Processor
- Linux 64-bit or Windows Server
- 8 GB of RAM
- 2 disks 10 K SAS in RAID 1 for the OS
- 2 disks 10 K SAS in RAID 1 for the block indexing database and the Lina databases
- 1 volume HDD of 5 TB in RAID to store the blocks (repository)
- 1 Gigabit network card

C1 Server Configuration :

To secure up to 250 agents or 10 TB of blocks

- Quad-Core Processor 64-bit
- Linux 64-bit or Windows Server
- 16 GB of RAM
- 2 disks 10 K SAS in RAID 1 for the OS
- 2 disks SSD 256 GB in RAID 1 for the block indexing database and the Lina databases
- 1 volume HDD of 10 TB in RAID to store the blocks (repository)
- 1 Gigabit or 10 Gigabit network card

C2 Server Configuration :

To secure up to 500 agents or 25 TB of blocks

- Octa-Core 64-bit Processor
- Linux 64-bit or Windows Server
- 32 GB of RAM
- 2 disks 10 K SAS in RAID 1 for the OS
- 2 disks SSD 512 GB in RAID 1 for the block indexing database and the Lina databases
- 1 volume HDD of 25 TB in RAID 5 to store the blocks (repository)
- 1 Gigabit or 10 Gigabit network card

C3 Server Configuration :

To secure up to 1000 agents or 50 TB of blocks

- 2 Hexa-Core 64-bit Processors
- Linux 64-bit or Windows Server
- 64 GB of RAM

- 2 disks SSD 140 GB in RAID 1 for the OS
- 2 disks SSD 800 GB in RAID 1 for the block indexing database and the Lina databases
- 1 volume HDD of 50 TB in RAID 6 to store the blocks (repository)
- 1 Gigabit or 10 Gigabit network card

C4 Server Configuration :

To secure up to 1500 agents or 75 TB of blocks

- Bi-Processor Octa-Core 64-bit
- Linux 64-bit or Windows Server
- 96 GB of RAM
- 2 disks SSD 140 GB in RAID 1 for the OS
- 2 disks SSD 1064 GB in RAID 1 for the block indexing database and the Lina databases
- 1 volume HDD of 75 TB in RAID 6 to store the blocks (repository)
- 1 Gigabit or 10 Gigabit network card

C5 Server Configuration :

To secure up to 2000 agents or 100 TB of blocks

- Bi-Processor Ten-Core 64-bit
- Linux 64-bit or Windows Server
- 128 GB of RAM
- 2 disks SSD 140 GB in RAID 1 for the OS
- 2 disks SSD 460 GB in RAID 1 for the block indexing database
- 2 disks SSD 940 GB in RAID 1 for the Lina databases
- 1 volume HDD of 100 TB in RAID 6 to store the blocks (repository)
- 1 Gigabit network card with 2 ports or a 10 Gigabit network card

3. Compatibility Guide

The Lina server can be installed on a Linux or Windows Server. Please refer to the compatibility guide of the version to be installed for a complete list of supported operating systems.

4.   Communication Ports
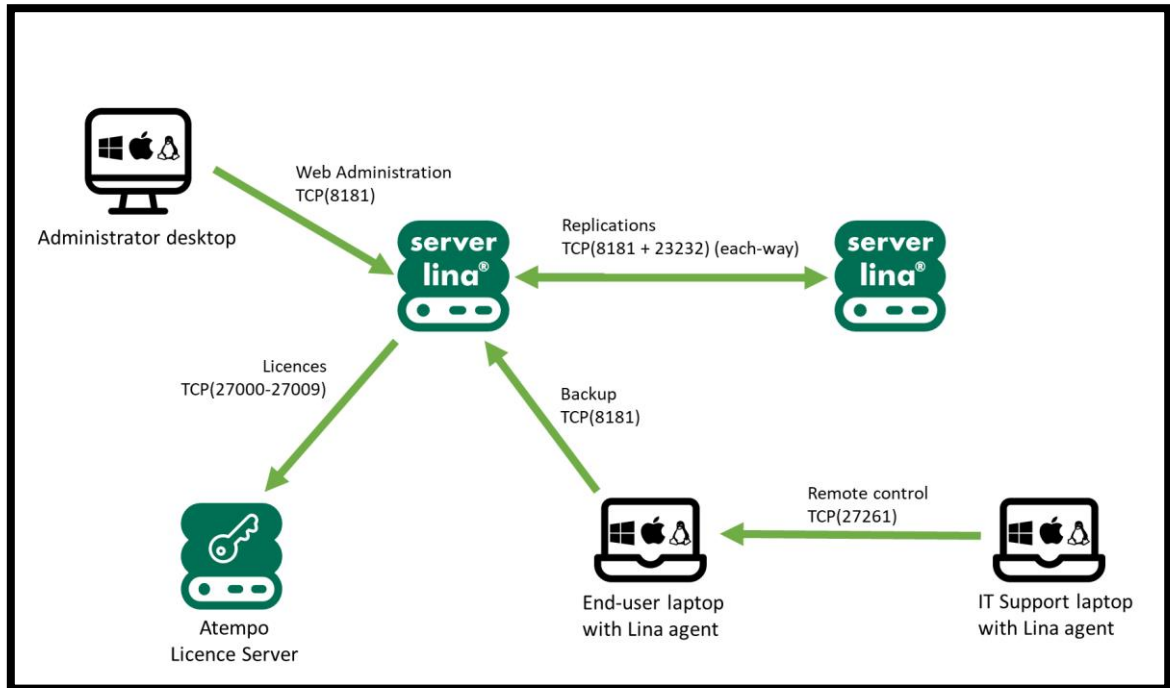
Component	Description	TCP Port	Flow
Lina Server	Access to the Lina administration console (https)	**8181**	Poste administrateur => Serveur
Lina Server	Port used by the replication at the ADE (Atempo Deduplication Engine) level	**23232**	Server <=> Server
Lina Agent	Encrypted backup flow between agent and server	**8181**	Agent => Server
Lina Agent	Agent taking control of another one for instance to perform a restore	**27261**	Agent => Controlled Agent
License Server	FlexLM License Server	**27000-27009**	Lina Server => FlexLM Server
Lina Agent (deprecated)	Encrypted backup flow between agent version < 5.0 and server	**9443**	Agent (< 5.0) => Server
Lina Agent (deprecated)	Non-encrypted backup flow between agent version < 5.0 and server	**9080**	Agent (< 5.0) => Server

By default, Lina agents communicate on the same port as the administration interface to send backup data. It is recommended to separate the administration port from the data port by configuring the following two advanced settings:

- httpd.port: Port used by the Administration interface

- httpd.data_port: Port used for backups and for the web restore (0 = same port as the administration interface)

  Note: if you activate a separate data port with the parameter httpd.data_port, keep in mind that the value of the parameter must be identical to the one on the agent. Since by default, all agents will communicate on the port 8181, we recommend that you keep port 8181 for httpd.data_port and change httpd.port to a different value, 8182 for instance.

5. Replication

Replication enables you to replicate data and configuration to a second Lina server. The secondary server must be sized identically to the primary server.

If the primary server is unavailable, it is possible to restore from the replicated Lina server.

6. Lina Administration Rights

The first time you connect, you must connect with the superadmin account (superadmin password).

For obvious security reasons, it is very important to immediately change the password of the superadmin account but also of the admin accounts of each tenant. Each time a tenant is created, an admin account is automatically created with a default admin password.

To reinforce the security of the admin account, it is strongly recommended to activate the two-factor authentication (2FA). The 2FA option can be activated directly from the Administration interface and will require a unique activation code to authenticate.

To retrieve the unique activation code, a mobile application such as Google Authenticator, Authy or Microsoft Authenticator is required.

It is possible to create local users or to import users or user groups from Active Directory or LDAP (v3 recommended). UTF8 is supported by Lina which enables to manage correctly the accented characters.

7. Web Interface and URL

The URLs of the different web administration interfaces are as follows:

- Administration Interface: https://server:8181/Admin/
- Web Restore for users: https://server:8181/webrestore/
- Web Restore for administrators: https://server:8181/webrestore/admin
- Web Restore multi-agents: https://server:8181/webrestore/batch
- To switch the Admin interface language between French and English:
  https://server:8181/Admin/?locale=en
  https://server:8181/Admin/?locale=fr

8.   About Microsoft OneDrive and SharePoint

Folders synchronized with Microsoft OneDrive and SharePoint or any other cloud based service are not supported and can block the backup. You should make sure to exclude them from your protection policies.

9.   SMTP Server Configuration

Lina relies on an SMTP connector to send email notifications to administrators and one-time passwords to end-users requesting a web restore.

Here is an example of how to configure the SMTP Server in command line using the **ade_admin** command:

set smtp.cfg=<smtp><server>smtp.office365.com</server><port>587</port><ssl>2</ssl> <user>user@domain.com</user><from>user@domain.com</from><password>XXXXXXX</password></smtp>