MaintMaster® Technical White Paper

Welcome to MaintMaster! MaintMaster is a leading tool for return on operational reliability for discrete manufacturing. This White Paper covers most of the technical aspects of MaintMaster.

We're constantly evolving. Any specification may be altered at any time.

MaintMaster lets you take control

We believe value is created by people. When people are inspired to make a difference, and have the tools to master their challenges, there's is no limit to their success. Using MaintMaster, your organization can achieve an unprecedented rate of reporting giving you insights otherwise lost. Since this reporting is quickly and easily done, MaintMaster will save much administrative time for all staff, leaving your personnel happy. The time savings when compared to other systems are often between 50 and 80 per cent. But the true advantage of MaintMaster is the way it helps you increase production capacity, reducing unplanned stops and minimizing overhead costs. Allowing the users to take control over their tool, they feel inspired and meet their challenges with a smile. And deliver astonishing value.

From a technical point of view, this means that we made MaintMaster simple to configure and manage, making it less of a technical issue. However, being a SaaS having locally installed apps there are technical questions that benefit from clarification. Questions like data security, client requirements, user management and network utilization need to be answered. If you don't find the information you need in this white paper, please contact our support team at MaintMaster System

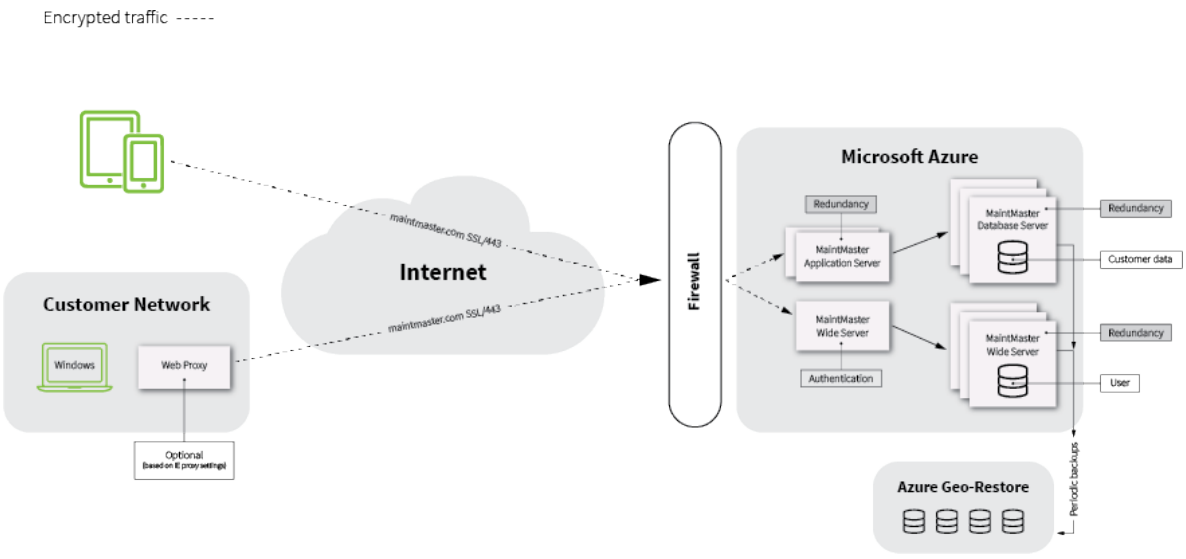

Fig 1. MaintMaster architecture diagram

MaintMaster is easy, agile and scalable.

MaintMaster services are delivered as Software as a Service, SaaS, in the public cloud. MaintMaster only requires a small client installation, just like any app. Therefore, it's easy to evaluate and get

started with. Updates are automatic, no need for local servers or backup routines. Simply put; minimal IT-administration. All you need is your internet connection.

Your users can be within or outside your organization, for instance all your external service technicians can get and report their work from their office. Whether you are one or many thousand users you will get the power you want. Add or decrease the number of users as your needs change.

MaintMaster is guaranteed up to 99.9% availability outside scheduled maintenance windows. These maintenance windows are never exceeding 8 hours and not more frequently than once per quarter.

Hosted by Microsoft Azure

MaintMaster understands that to realize the benefits of the cloud, you must be able to trust the cloud. So do our hosting partner, Microsoft. Microsoft Azure offers the most secure and trusted platform for cloud services. Microsoft has been leading the industry in establishing clear security and privacy requirements and then consistently meeting these requirements. Azure meets a broad set of international and industry-specific compliance standards, such as ISO 27001, HIPAA, FedRAMP, SOC 1 and SOC 2. MaintMaster utilizes many of the features offered by Azure to operate, secure and monitor our services.

Azure is available in most regions of the world. MaintMaster can therefore be hosted in a region near you and your data is always kept in that region.

For more information on Microsoft Azure, see https://azure.microsoft.com/en-us/overview/trusted-cloud/

Maintmaster uses hosting partners who support and administer our production system in Azure. They work under the same restrictions as Microsoft's technicians. Our hosting partners are physically located and working in the same jurisdiction as the hosted system. We commit to informing our customers at least 30 days before any changes to our hosting organization or model is enacted.

Security of your data is one of our top priorities

- Microsoft Azure – More certifications than any other cloud provider.
- Network security – All data is encrypted using https with TLS (version 1.3 preferably) before being sent over multiple secured network connections.
- Privacy security – All passwords are kept in an irreversible state, not even our technicians or developers can reverse them. For more information, see the *MaintMaster Privacy Policy*.
- Backup – Point in time restore for at least 14 days for all production data, more for enterprise level customers, plus long-term distributed backups kept available for at least 12 months.
- Disaster recovery plan – Everything needed to recreate the entire hosting environment is available off site, including backups of your data, still never leaving your region.

Integrate, extend and connect

Integrate MaintMaster to your other systems for a complete overview and let each system do what it does best. *MaintMaster® Integrations Services* offers a wide range of integration adapters, ready to be configured for all your integration needs. *MaintMaster® Extensions* provide a framework for plugin functionality, both standardized Addons from our library and custom created modifiers for our Enterprise Edition customers.

Learn more about integrating and extending MaintMaster from your MaintMaster representative.

MAINTMASTER®

We keep an eye on your system

We monitor many aspects of our services, from availability and response time to analyzes of user interaction and data in our customer systems. We use this information for compliance to our SLA, to react when something is wrong and to improve our services.

An example of how we continuously monitor the usage is the individual load, see picture below.

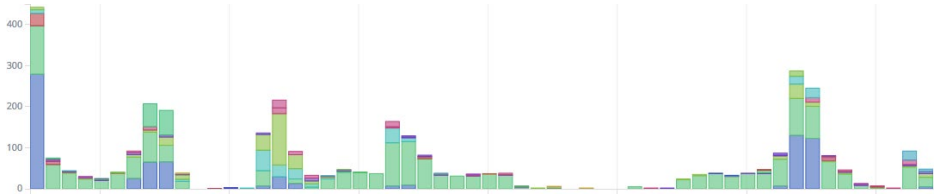

Fig 2. MaintMaster load diagram

MaintMaster terminology

Basically, you pay for the users that have access to use your MaintMaster. All data that you manage and save in MaintMaster is held in what we call a *System*. This is typically a database, a storage area and a setup of application files. You invite *Users* to use your system. The users are added within the system and invited using their email address. Each user confirms the account and sets password and language. The email address will be the *username*. We will communicate with the user using email, for instance the invite with instructions is sent from MaintMaster.

There are three *Editions* of MaintMaster, differing in size, extendibility, SLA and support.

There are two types of administrators for MaintMaster. *Solution Administrators* manage everything about the solution; licenses, billing information, systems and administrators. *Complete Access Users* are users with high permissions inside the systems, typically the ones managing the maintenance work. A user can have both these roles. We recommend that you at all times have a minimum of two users assigned to each of these administrators for redundancy.

Solution Administrators use the MaintMaster *Portal* for administrating the solution, see portal.maintmaster.com.

For customers having integrations or extensions, a test environment is required. We call this system a *Sandbox*, a safe environment that is created using a copy of the *Production* system which in turn is the system you use in your day to day maintenance management. Prior to each release, the Sandbox will be updated, and customers notified. It's important to test all integrations and extensions promptly. After 10 days the release is considered tested for custom needs and is scheduled to update all Production systems.

In addition to these two systems, MaintMaster offers a *Training Company* system. This system has demo data and can be used with our training exercises, e-learning and your own training sessions.

MaintMaster User Account

A user with adequate permissions, often the administrator, invites new users to take part in a MaintMaster system. When inviting, the administrator sets permissions and roles, it's all done in the normal MaintMaster desktop client. The invite is sent via e-mail and the new user creates a MaintMaster account if not already a MaintMaster user.

Azure Active Directory and SSO

When the new user confirms the account there's an option to get authentication from an Azure AD. This requires that the customer has an Azure AD (or has an Azure AD in sync with a local AD) and that this AD (domain) has MaintMaster authentication privileges set. Existing users can logon to the MaintMaster Portal and change the authentication to Azure AD. If requested, MaintMaster Support can set a white list for your domain to make sure that all your accounts are authenticated from your AD.

Installing MaintMaster

MaintMaster is available as modern apps as well as a Windows client for Windows 10. There are apps available for iOS and Android. These are available and installed from their store respectively. The apps are subsets of the entire MaintMaster system. To utilize configuration and some functionality, you need to install the full Windows client, see below.

The Windows installation

The process of installing MaintMaster includes these steps:

- The downloadable Windows Installer file MaintMasterSetup.exe installs the MaintMaster Launcher.
- The installation does not require any administrative privileges.
- MaintMaster Launcher downloads and maintains a complete set of all files needed for any configuration available to the current MaintMaster user.

Windows Installer file MaintMasterSetup.exe

The downloadable part of MaintMaster Windows client is a small installation with just nine files and two Windows shortcuts. The files will be installed in the Users AppData directory, typically "C:\Users\<user>\AppData\Local\MaintMaster\8.0". The Windows shortcuts created are one for the Desktop and one for the Start menu. The main installer can be downloaded from maintmaster.com or pushed out to clients using your Windows Installer compatible tool.

For altering the conditions for the MaintMaster installation you need to use a Windows Installer Transformation file (.mst file). MaintMaster will use your transformation file automatically for all subsequent installations once put in the MaintMaster ProgramData folder, typically "C:\ProgramData\MaintMaster\Version8\Launcher Transform". A transform file is recommended if you need to control your installation in ways other than the default installation offers.

If you need to unpack the installer, for instance to find the .msi-file, just run MaintMasterSetup.exe with the /A

switch: "MaintMasterSetup.exe /A". This way the installer will ask you where to unpack all files.

MaintMaster Launcher

In the Windows environment, MaintMaster is actually a set of two individual software; the launcher and the main user interfaces (the clients). The launcher is what's installed during setup. It's responsible for starting the correct client for the right system of the right version and configuration, and for signing the user in. You can run multiple clients, versions and configurations simultaneously. There are a lot of advanced options in the launcher that can be used with switches. For a complete list try the /? switch: "MaintMaster.exe /?" or just hold down Shift while starting MaintMaster.

The launcher will update itself automatically, downloading a new installation and starting the setup. If the registry key HKEY_LOCAL_MACHINE\SOFTWARE\MaintMaster\AutoUpdates is set to "0",

automatic updates of the launcher are disabled. All launcher installations will be advertised at least 10 days prior to release in order to do the installation by any other means. Please note that the launcher is always backward compatible (for all supported versions of MaintMaster) but is required past release date running updated systems. This means that there is a 10-day window to do the upgrade if you for any reason can't use the fully automatic update.

After that MaintMaster will not work.

First time, and any time later, MaintMaster (the launcher) will automatically download all needed files for running correct version and configuration for each system. Any subsequent updates will be managed automatically by MaintMaster, downloading any changed client file at start. At download, all files are stored in a common cache for all systems and all users at the same computer, typically "C:\ProgramData\MaintMaster\Version8\common cache". From the common cache an individual copy of needed files will be copied to a user and system specific folder for each combination of user and system, example "C:\ProgramData\MaintMaster\Version8\<user>\<system>\bin". In the system folder you will also find folders for cache data for improved performance. Depending on configuration and the amount of big data, such as images, these folders can grow in size. When updating MaintMaster files for a specific system, there
can't be any running instances of MaintMaster running in Windows. Therefore, the launcher will automatically close such sessions.

Reach our servers

MaintMaster communicates over the standard Internet protocol https using port 443. Any client needs to be able to reach all servers in maintmaster.com (both maintmaster.com and *.maintmaster.com). MaintMaster reads the current user's Windows Proxy Settings. This process includes the IE options to automatically detect proxy settings, use an automatic configuration script, manual proxy server settings, and advanced manual proxy server settings.

All traffic is encrypted using TLS version 1.3 by default, but we can support TLS version 1.2 by request.

Backups

We use Microsoft Azure SQL as our backbone for database management, compatible with Microsoft SQL Server 2017. Azure offers Point-in-time-restore as well as weekly and monthly backups for long term storage. In addition, we offer downloadable backup files in bacpac format to our Enterprise Edition customers. If you ever need to read a backup file from your system you need to have Microsoft SQL Server 2017.

From the admin client you can always export all data to Excel readable format.

How long backups are retained varies by edition and backup type:

	Sandbox/Test	Team Edition	Standard	Enterprise
Point in time restore	7 days	14 days	14 days	35 days
Weekly backup	-	5 weeks	5 weeks	5 weeks
Monthly backup	-	12 months	12 months	12 months

Platforms

The main Windows desktop MaintMaster client is written for the .net framework in C#. In order to run the client, the version 4.7.2 of the .net framework needs to be installed.

All applications require an Internet connection.

The Android and iOS applications will require an installation from Google Play and Apple App Store respectively. They can, if set on the device, be updated automatically.

MaintMaster commits to support the Windows, Android and iOS platforms according to the mainstream support that is offered from each publisher respectively.

Virtual environments

The MaintMaster admin client and shortcut can run on other platforms, like Macintosh and Linux, using virtual environments such as Wine. However, MaintMaster is only tested and supported for the standard Windows platform. The same goes for Windows based virtual solutions such as Citrix, App-V, Terminal Server and VMware. There are however some settings to be made in the launcher to get control over how installations are performed in these environments, please see the section about the installation. It's also worth noticing that MaintMaster keep an updated copy of all required files for each user. In virtual environments that are started with a totally clean profile every time, please include all downloaded files in the profile to prevent redundant downloading of files. For the same reason, you might want to consider using the switch /scf (SkipClientFilesUpdate). That way MaintMaster will not download any files, even if there are updates. But MaintMaster will not start and you need to update your profile. For environments with multiple users at same server, such as Terminal server or Citrix, you need to consider the amount of data cached locally. This will typically add up to about 100 MB for each Windows user.

More information

There are many documents to describe different aspects of MaintMaster:

- MaintMaster Integration Services
- MaintMaster Extensions
- MaintMaster Agreements Explained
- MaintMaster General Online Terms
- MaintMaster License
- MaintMaster Privacy Policy
- maintmaster.com

For more information on Microsoft Azure:

- azure.microsoft.com