SuperOffice

A dive into our technological platform

Foreword:

This document describes the SuperOffice CRM product in a general, operational context with a peek into our Development strategy and main USP's This should not be considered a complete cookbook on how to run SuperOffice , since that is dependent on a number of parameters – Network architectures , usage patterns and integrations. Instead, it outlines several scenarios and describes what to look for and what to expect when using SuperOffice and its modules.

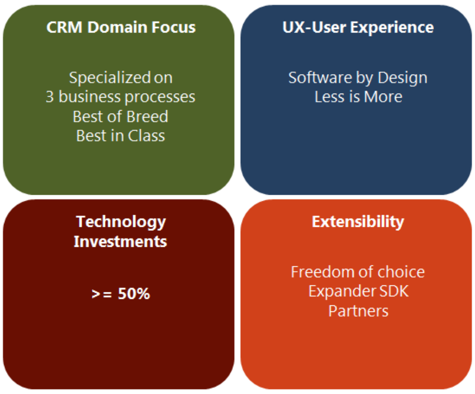
Architecture and Development

Our Research & development department is using Microsoft as their main development platform. This consists of Visual Studio 2010 and Team Foundation Server (TFS) as the server back-end. Our applications are written mainly in C++,C# and ASP.NET. Our mobile/tablet App is using the mBricks library that is Java based making it runnable on almost any device. A common platform that is used by all our modules and applications is the SuperOffice NetServer. This is what we refer to as the business logic. In a nutshell, NetServer is a layered, factory-driven library that enables developers to conduct Create, Read, Update and Delete (CRUD) operations to the SuperOffice database, and more. Whether deploying a solution to a local SuperOffice database installation, or operating in a distributed environment, NetServer exposes an array of application programming interface (API) approaches to facilitate a wide range of solution implementations.

Strategy

Our vision is to deliver software solutions which positively influence the individual user, by making their daily tasks more efficient, easier and fun the user experience is by far the most important aspect of our development strategy, ***less is more***. Whenever we develop new software our main focus is to make it as efficient and intuitive as possible by removing the amount of user interactions.

We are heavily investing in technology and approximately >50% of our resources are involved in different resource programs and constantly working with this area.



CRM Domain Focus

Specialized on
3 business processes
Best of Breed
Best in Class

UX-User Experience

Software by Design
Less is More

Technology Investments

>= 50%

Extensibility

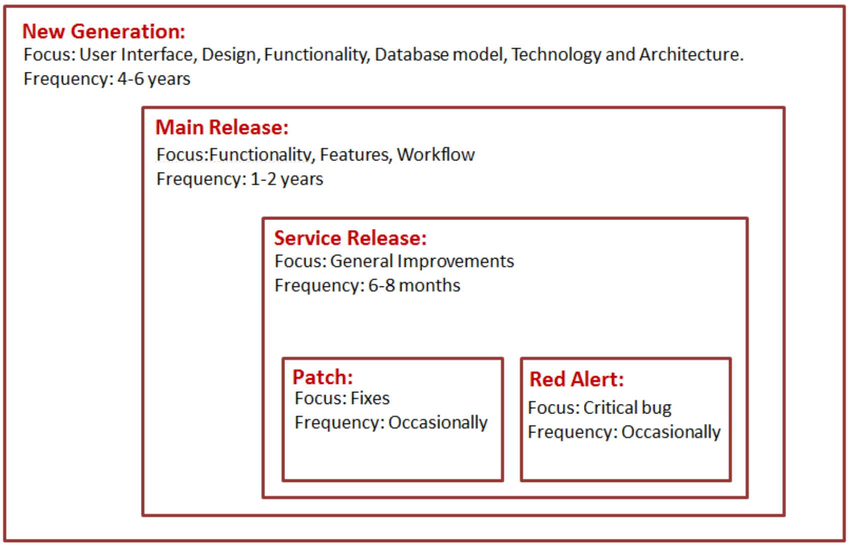
Freedom of choice
Expander SDK
Partners

A best of breed solution like SuperOffice CRM is depending on supporting a high level of integration and customization. In fact, even though you can start to run SuperOffice CRM out of the box from day one, we offer an extensive range of integration possibilities. You can integrate SuperOffice with any system you like, using the technology you prefer. This could mean using web-services to exchange data, using COM to interact with the application, VB script to extract data or simply present data from another system in a HTML window inside SuperOffice.How this is done and live examples of this is well documented in our SDK that you can read more about on our developer community "***DevNet***" .It's a community where both developers and technical people can share experience and collaborate in terms of enhancement/customization of their SuperOffice solution. SuperOffice has Expander, a platform from which customers can piece together their vision of a harmonious user experience. The various Expander components provide partners and customers with the tools needed to fulfill those requirements.

Last but not least we have office automation which has been major part of our software from the beginning. This includes the traditional contact management, creating task, appointments, documents etc. This is the core element in SuperOffice and something that we will continue to enhance regardless of new functions & features.

Product Release Strategy

This is the overall release strategy from R&D regarding the SuperOffice software. Scopes and content may differ depending on the type of release, but there is a common denominator and that is always improving the software and continues to make it user friendly!



New Generation:
Focus: User Interface, Design, Functionality, Database model, Technology and Architecture.
Frequency: 4-6 years

Main Release:
Focus:Functionalitv, Features, Workflow
Frequency: 1-2 years

Service Release:
Focus: General Improvements
Frequency: 6-8 months

Patch:
Focus: Fixes
Frequency: Occasionally

Red Alert:
Focus: Critical bug
Frequency: Occasionally

Freedom of Choice

When SuperOffice uses the term “freedom of choice” we simply give you the opportunity to choose what platform you want to run SuperOffice products on or what kind of software you would like to use together with SuperOffice. Our intention is that choosing SuperOffice, should not limit your freedom to keep your own platform strategy. We interact with all the major players in the market when it comes to e-mail, database, browsers and smartphones. You can even run our web based product from a Mac or Linux computers. SuperOffice should not dictate your IT strategy, we will adapt to your choice.

User administration

New users are defined through the SuperOffice Admin client. There are two authentication methods available when creating new users – **SuperOffice** or **Active Directory**. If you select SuperOffice we will be responsible for authenticating the user prompting for a username and password when logging in. If you prefer to use Active Directory, Windows will be responsible and no login screen will appear. I must emphasize that this is not an Active Directory integration or sync, purely another way of using single sign-on. In both examples an application user will be created but the database user is since 7.0 obsolete. We only need one user accessing the SQL database on behalf of all users. The general user administration in SuperOffice is a ferly easy task and can be performed by others than only the IT department.

Role Based security

As part of the new security system inside SuperOffice we have created a role based system where you have the opportunity to define the user’s data access and functional rights, meaning customizing what the user can **see** and **do** with data. With role-based security in SuperOffice, you can set different access levels in the company. It contains a number of predefined roles as well the possibility to create your own custom ones. Together with the active directory authentication we described earlier, we have now a full fledge security system inside SuperOffice.

MDO, Large organization and cross-country support

This feature is used to group list items (e.g. meeting types, document types, company categories) under user-defined headings, and optionally to filter items per user group. It is thus possible to have one set of document templates presented to Sales employees, and another (overlapping if needed) set to Developers or Management. If the company is multi-lingual, support exists for having multi-language definitions of list items, custom labels pr. country, different address format, currency and time zones so that users get SuperOffice in their native language. Of course, this has to be maintained through the Admin client by a super user. Using the features the system can be customized for the different departments of a large organization and even cross-country.

Preferences

The SuperOffice clients use a large number of preference settings to customize features – search behavior, history tracking, default texts and choices, and many other details. Preferences can be set through the Windows or web client GUI by individual users, or central in the Admin client by an administrator. Most preferences are set in a hierarchical system, from individual user via department and database to system-wide. Settings at a lower level override higher levels and vice versa. As a result, a user who prefers to have a longer history list for appointment type choices can easily override the standard preference, while an administrator can set a global preference, valid for all users, in a single operation. Administrators also have the option of erasing individual user preferences when setting department or system-wide values, and can easily view the current setting for any preference, for any user. The preference system GUI is fully parameterized, so that any partner- or in-house developed add-ons can add their preferences to the common system.

Performance considerations

The performance of SuperOffice depends on several parameters:

- The amount of data in the database
- The number of simultaneous users
- Network performance
- Usage patterns
- Server/computer size and power
- Infrastructure in general

It is not possible to specify that under certain defined circumstances, a certain operation will take a given time – the space of parameter combinations is too large. However, general guidelines and relative weights are given here.

The amount of data

SuperOffice is relatively insensitive to the amount of data in the database. Customers have successfully had more than 1.5 million contacts ,more than 1.1 million appointments and documents without any Working with selections containing 20 000 contacts is also possible with no great delays. We have done extensive performance testing in key areas, and incorporate improvements in service releases whenever needed. In general, SuperOffice databases tend to be modest relative to the power of modern hardware, so they often fit completely in the in-memory cache of a moderately configured database server (2-4GB of RAM).

As an example, a database with 1.5 million contacts takes up about 3.5GB, including addresses and phone numbers for all contacts. Another example is a database with about 50.000 contacts, 120.000 persons and 1.1 million appointments, and the corresponding number of addresses, phone numbers, emails etc. Total size is about 0.5GB, easily handled by any server nowadays. Based on these examples there should not be any limitations on the actual database server no matter usage pattern.

Usage

The Windows client incorporates extensive data caching in its design, with a default timeout of 10 minutes. Within this interval, data are generally not requested more than once. However, some elements are fetched from the database every time they are accessed, such as activity and task lists. In such cases the fetching operation has been extensively optimized.

Users who frequently jump between contacts, view different weeks or month of their diaries, and run heavy reports and complex selections obviously cause a greater load on the database. This load scales linearly with the number of users. The number of active database connections varies from one to a maximum of around four for each client (it is automatically adjusted over time, depending on activity). The database server must be configured with sufficient resources to handle this number of connections.

Periodically (every 10 minutes by default), the client polls the server for invitations to meetings and other background tasks. With a high number of users, this creates a “background” load – but since the queries are optimized, the database will quickly end up with all relevant data in caches, provided there is enough RAM.

In large configurations, multiple CPU’s on the database server will provide needed power; another possible bottleneck may be the network interface, where multiple cards will help. The most usual limiting parameter is RAM, if the amount of physical memory is equal to the size of the database, plus half a gigabyte for the operating system, there are fewer disk accesses.

Client and server hardware

Client-side performance is mainly limited by RAM and CPU; there are very few local disk operations beyond loading software modules and documents. A running Windows client uses upwards of 200 - 300MB of RAM , this will not be an issue with modern laptops today however in an virtual and/or Citrix environment where users share hardware this must be taken under consideration. The SuperOffice server consists of two parts; one is only a distribution area where all the client software is located and the other is the document archive. This is a file share protected by windows NTFS rights.

Network

The majority of network calls done by a SuperOffice Windows client are calls to the database using TCPIP but also request calls to the file server using SMB protocol. This protocol is synchronous and therefore latency is usually the limiting parameter, not bandwidth (except at the server). The start-up time for SuperOffice Latencies of more than 40-50ms cause noticeable performance degrading, again mostly during startup – when running, the caching keeps the number of database hits low.

Plugins and SDK

The default document storage in SuperOffice is called “So_Arc” and is on a shared directory on a server. There is a document provider plug-in architecture, and several implementations for more advanced archives exist. (e.g. SharePoint, and eDocs) If one of these is used, documents created from SuperOffice are stored inside that plug-in architecture and instead of on a file server.

In the current version (7.x), the security system is fully configurable both for data access and function access. However, there is a plug-in interface – the Sentry plugin – for those who wish to write a more sophisticated system. In principle, a sentry plug-in will be called every time SuperOffice needs to make a decision about the visibility of a record, or the legality of an update. The plug-in has access to the data and can add restrictions as it sees fit. It cannot override restrictions imposed by the system.

In SuperOffice you can add new tables to the database and the SuperOffice Data Dictionary through the Dictionary SDK. Tables added in this way can be replicated by the Travel/Satellite functions, indexed by the Free Text indexer and generally be part of the data set handled by SuperOffice. This also makes them easy to backup synchronously with the rest of the SuperOffice data.

Of course, tables can also be added to the SuperOffice database without using the Dictionary SDK; such tables will be part of a backup, but cannot be replicated by SuperOffice.

SuperOffice Pocket CRM

This is the SuperOffice what we refer to as our “app”. This is available for all major devices and OS’es including Android, iOS and Blackberry. To be able to run this application some preparations must be done at the customer site so that we can communicate on the internet. The traffic is AES encrypted. This is an online solution meaning that very few data is stored and cached on the device. If you lose your device an administrator can remove the user license to prevent anyone accessing the device.

Pocket CRM uses NetServer against the SuperOffice CRM database. When it comes to “Blind SQL Injection” the NetServer uses a parametrical query that prevents SQL injection. NetServer uses well known mechanism for authentication, authenticity, authorization, encryption and access control. This is analyzed and developed in cooperation with Sintef in Trondheim, Norway.

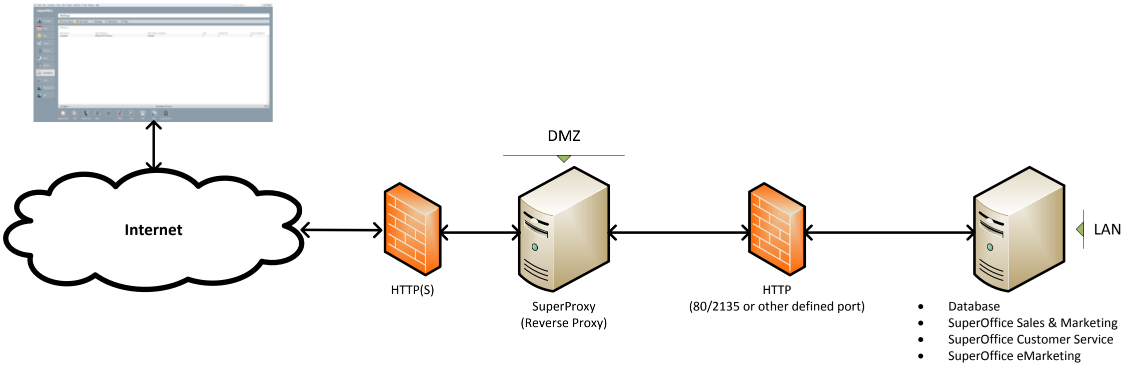
Both Pocket CRM and NetServer have a conscious relation to not leak critical system parameters from the solution. Pocket CRM works as a proxy to NetServer and contains therefore no system critical information.

In a roll-out of Pocket CRM and NetServer there are some moments to consider:

1. To reduce the attack surface the Apache Tomcat and NetServer does not have to be exposed in public networks. Use ISS forwarding proxy (“connector”) for access.
2. Increase security by setting up barriers / router/ firewall between the different components – database – tomcat – ISS forwarding – the Pocket CRM client.
3. Using AD authentication to enforce password policies and prevent the use of simple passwords.
4. Ensure that mobile phones are secured, use pin code and screen lock. Consider the use of BlackBerry if you wish to use a restricted security model.
5. Set up monitoring and logging to detect potentially suspicious activity.

SuperOffice SuperProxy

SuperOffice SuperProxy is a reverse proxy that retrieves resources on behalf of a client from one or more servers internally (LAN). These resources are then returned to the client as though they originated from the internal server (LAN) itself. A reverse proxy acts as an intermediary for its (usually nearby) associated server(s) and only returns resources provided by those associated server(s).


DMZ
Internet
HTTP(S)
SuperProxy
(Reverse Proxy)
HTTP
(80/2135 or other defined port)
LAN
Database
SuperOffice Sales & Marketing
SuperOffice Customer Service
SuperOffice eMarketing

This may be the case when installing the SuperOffice modules; Customer Centre and SuperOffice eMarketing. These modules need to be available for external users to be able to “interact” with the CRM database. In these cases some traffic need to be routed from the internet to your domain and using the described Proxy server. The latter should be sufficient for any network administrator in terms of keeping security in place. The reverse proxy solution is used by most of the ASP providers today.

SuperOffice Web Tools

SuperOffice Web Tools, including DocLink (Formerly known as TrayApp and SuperOffice Extensions) and MailLink is a set helper applications running locally on MS Windows and Apple Mac. These tools communicate to the web server using Windows Communication Foundation (WCF) hosted by IIS as part of the SuperOffice SM.web application. This communication channel can be secured with HTTPS and could also require Windows Authentication – regardless of the SuperOffice user being mapped to Active Directory or not.

SuperOffice DocLink

The DocLink runs in the system tray. The role of the utility is:

- Download and upload files: The user double-clicks on a document in the CRM client. The document is downloaded to the client computer. The DocLink is listening to lock events on the file and the operating system process editing the file, and uploads the document back to the server when the document is changed or the process editing the document has completed. This eliminates the need for manually uploading the document without requiring browser-specific add-ons.

- Check for alarms (meeting reminders) and notify the user.

- Assist in login: Double-click on the owl in the system tray or click on SoProtocol (superoffice://…) links (in mails, etc), result in the browser navigating directly to the CRM site.

- Download contacts and appointments to local diary and contact store on Mac

The DocLink knows about passing credentials to the SuperOffice CRM application. This can either be in the form of active directory (windows) tokens being passed with the web service request as part of the HTTP protocol or credentials sent as part of the soap message as:

- SuperOffice username and passwords
- Active Directory username and password
- SuperOffice authentication tickets

The SuperOffice NetServer (within the SoDatabase.dll) will verify these credentials.

- SuperOffice username and passwords: A salted hash (SHA-1) of the password is stored in the credentials table of the CRM database. The client will re-create this hash and verify that it matches.
- Active Directory username and password: User-name and passwords are sent to Active Directory verification. The SSID of the user is stored in the credential table and needs to be matched
- SuperOffice authentication tickets: Tickets hold two keys (GUIDs). One of these keys is directly matched to the credentials table and the other key must match its' salted hash representation in the same database row.

Tokens passed in the HTTP header are verified by IIS and otherwise matched similar to Active Directory username and password authentication

The DocLink starts up when the user logs in locally on his computer. The user may choose to store credentials in DocLink. This results in the credentials being stored in application isolated storage using symmetric cryptography.

SuperOffice Mail Link

The SuperOffice Mail Link is a similar extension hosted inside either the Microsoft Outlook or Lotus Notes process, except for a few, specific external utility-programs specified below.

The role of mail link is:

- Provide integration with SuperOffice, both Windows and Web, including when on travel.
- Provide ability to archive emails (existing and new) and attachments to the SuperOffice document-archive. This is done in-process.
- Provide ability to register and lookup contacts registered in SuperOffice directly from the email-client. This is done in-process.
- Provide the ability to open, reply to and forward archived emails in your email client. SuperOffice web depends on SuperOffice.Mail.Protocolhandler.exe to handle this via the custom somail-protocol.
- Provide the ability to do mail-merge and send meeting-invitations when setting up meetings with other participants. SuperOffice web depends on SuperOffice.Mail.Protocolhandler.exe to handle this via the custom somail-protocol.
- Other included utility-programs are SoMailParser.exe for handling email archived from Lotus Notes, SuperOffice.MailLink.ClientConfiguration.exe for handling automated deployment configuration, and companion 64-bit binaries for interaction with 64-bit host-environments.

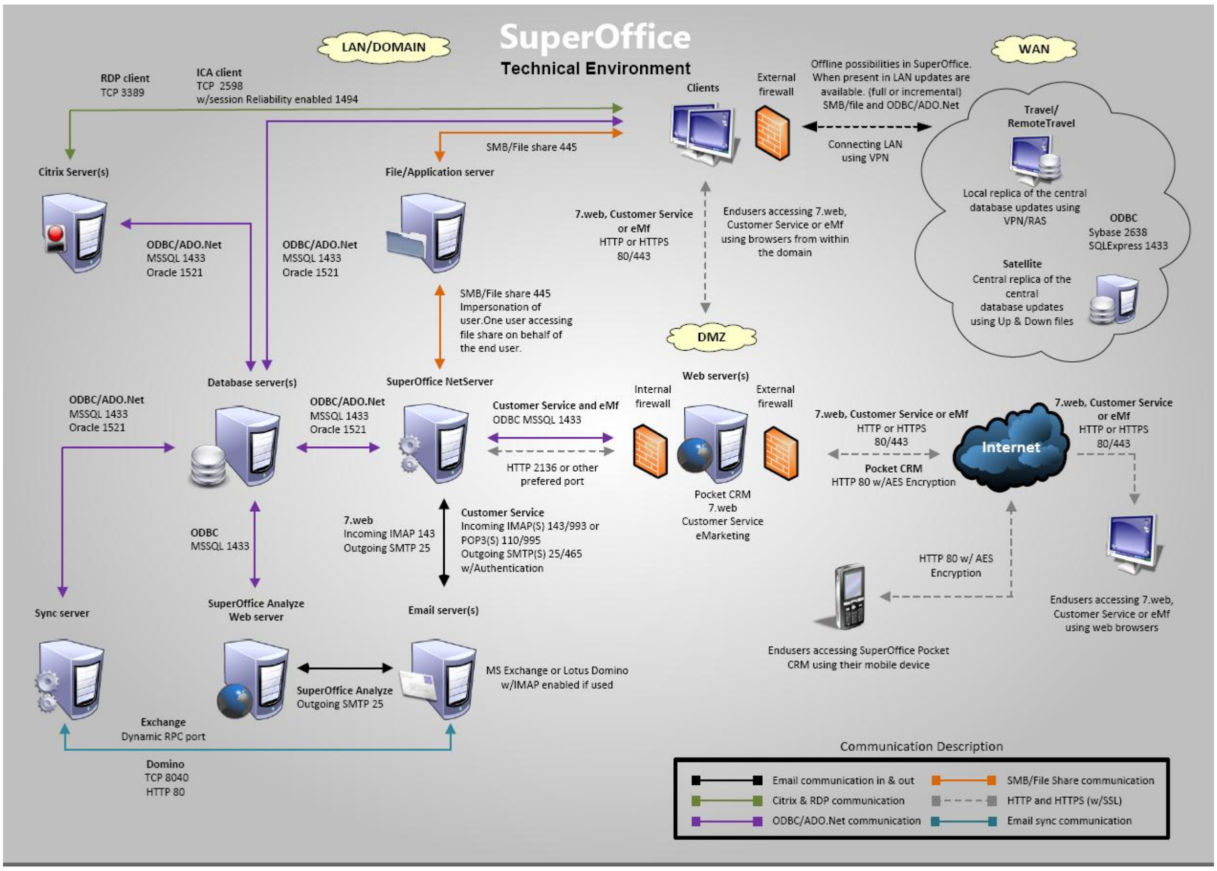
SuperOffice Mail Link stores its credentials using symmetric cryptography following the exact same model as the one used in SuperOffice DocLink, except that the encrypted configuration files are stored in the user's roaming AppData-folder.
All interaction with the SuperOffice SM.web server is handled through a specialized WCF service (MailLinkService.svc) which is included in SuperOffice Web. All requests are authenticated against the server following the exact same model as the one used in SuperOffice DocLink.
SuperOffice Mail Link interacts with the SuperOffice web-client's user-interface using soprotocol-invocations. This depends on SuperOffice DocLink being installed, and SuperOffice DocLink is responsible for authenticating these requests with the browser.

SuperOffice Ribbons

SuperOffice Ribbons does not support SuperOffice web and is not included in SuperOffice Web Tools, but is mentioned here for clarity and to avoid confusion.

SuperOffice ribbons (for Microsoft Word, Excel and PowerPoint) are Office-addins which are hosted inside the Office applications, enabling SuperOffice integration.
SuperOffice ribbons only run when the Office applications run and when they run, they run in the user's context. SuperOffice ribbons depend on the SuperOffice Windows client for connectivity and communicate in-process via COM, and therefore do not need to store any credentials at all.

SuperOffice Technical Environment

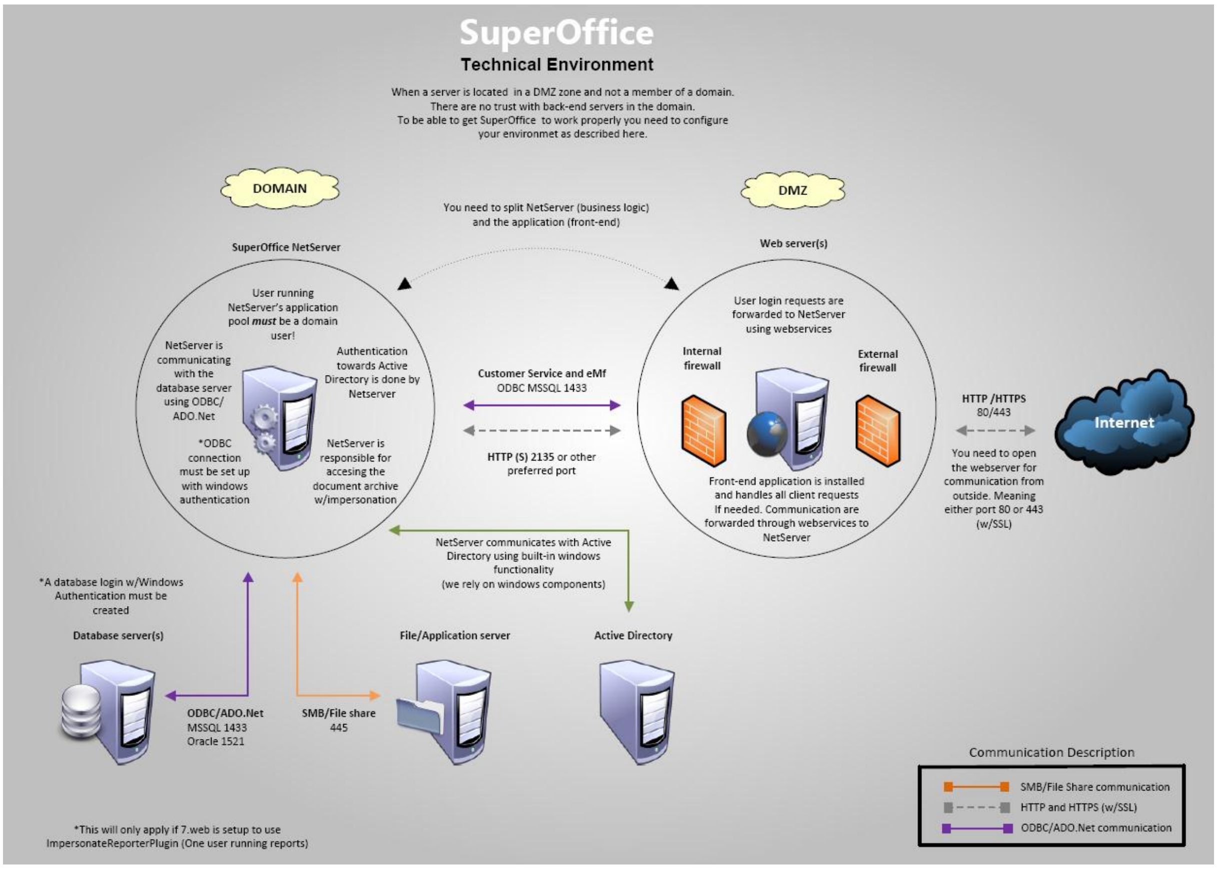


SuperOffice

Technical Environment

Communication Description

■—■	Email communication in & out	■—■	SMB/File Share communication
■—■	Citrix & RDP communication	■- - -■	HTTP and HTTPS (w/SSL)
■—■	ODBC/ADO.Net communication	■—■	Email sync communication



SuperOffice

Technical Environment

When a server is located in a DMZ zone and not a member of a domain.
There are no trust with back-end servers in the domain.
To be able to get SuperOffice to work properly you need to configure your environmet as described here.

DOMAIN
DMZ
You need to split NetServer (business logic) and the application (front-end)
SuperOffice NetServer
User running NetServer's application pool *must* be a domain user!
NetServer is communicating with the database server using ODBC/ ADO.Net
Authentication towards Active Directory is done by Netserver
*ODBC connection must be set up with windows authentication
NetServer is responsible for accesing the document archive w/impersonation
Customer Service and eMf
ODBC MSSQL 1433
HTTP (S) 2135 or other preferred port
Web server(s)
User login requests are forwarded to NetServer using webservices
Internal firewall
External firewall
Front-end application is installed and handles all client requests If needed. Communication are forwarded through webservices to NetServer
HTTP /HTTPS
80/443
You need to open the webserver for communication from outside. Meaning either port 80 or 443 (w/SSL)
Internet
NetServer communicates with Active Directory using built-in windows functionality (we rely on windows components)
*A database login w/Windows Authentication must be created
Database server(s)
File/Application server
Active Directory
ODBC/ADO.Net
MSSQL 1433
Oracle 1521
SMB/File share
445

*This will only apply if 7.web is setup to use ImpersonateReporterPlugin (One user running reports)

Communication Description

■—■	SMB/File Share communication
■- - -■	HTTP and HTTPS (w/SSL)
■—■	ODBC/ADO.Net communication