



# Remote Desktop solutions

CAS genesisWorld with  
Remote Desktop solutions



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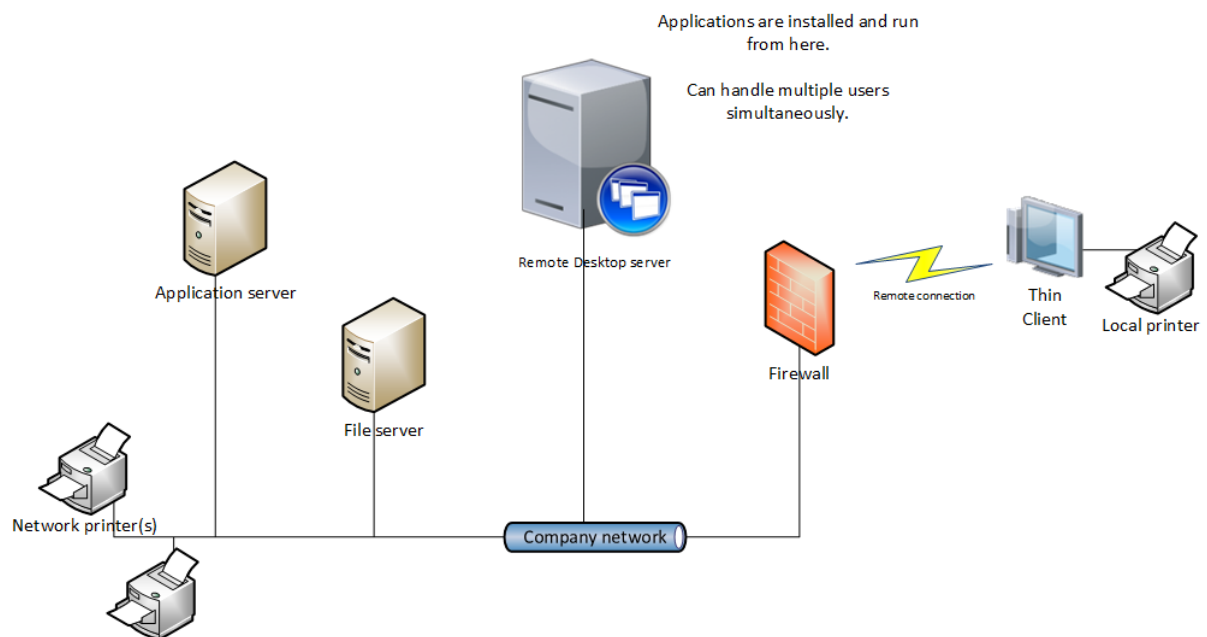
# 1 Overview of Remote Desktop solutions

In a classic environment, operating systems and programs are installed on to a so-called Rich Client. A Rich Client is a classic and fully-fledged Windows computer. Users log on to the computer and use the hardware (monitor, keyboard and mouse) together with the software (any installed programs including the operating system) to help them with their work.

Remote Desktop solutions take major components of a fully-fledged Windows computer and move them (relocate) them to a central Windows Server. The programs are thus installed on the server and run from there. All the resources and connections required on the Windows Server are used.

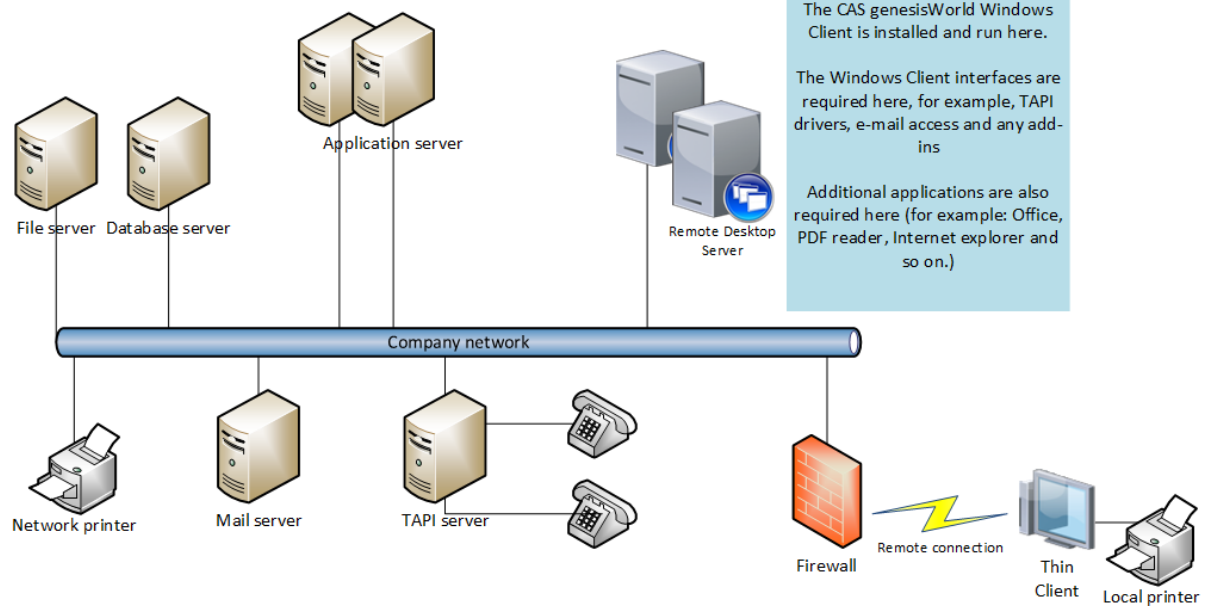
The user's device is known as a so-called thin client, because it is limited to the input and output of information which is produced or processed on the Windows Server.

This can result in the thin client being somewhat restricted in its resources, because the actual work (processing) is being done on the Windows Server. Multiple users can work simultaneously with Windows programs and run complete desktops on the Windows Server through their thin clients.



The diagram illustrates the principle relationships between the various systems for Remote Desktop services. The scenario depicted here is deliberately simplified to show that there is a separation between program execution (Remote Desktop server) and the display of the program window (thin client). Therefore program typical communication is thus complete in your company network. Only the inputs and outputs from the program have to be transferred to the thin client.

With respect to CAS genesisWorld, the following diagram helps to illustrate the placement of the individual elements within a network structure.



The next diagram shows that the CAS genesisWorld Desktop Client is installed on and run from the Remote Desktop servers, and also communicates with the Application servers and other services using the fast company network. Everything that is normally required on a local PC is installed on the Remote Desktop system. In particular, this includes any integrations to Microsoft Outlook add-ins and Microsoft Word add-ins as well as the TAPI driver.

Peripheral devices such as a printer are optionally connected via the Remote Desktop server, for example, a network printer on the company network. Alternatively, a special redirection can be set up from the thin client, for example, for a home office printer. This also applies to local directories, network drives or USB devices. Whether such devices and resources are used depends very much on the solution being used and the way the group policy has been set up.

## 1.1 Solutions for Remote Desktop systems

Common solutions for the provision of Remote Desktop systems include:

- Microsoft Remote Desktop Services
- Citrix Xenapp

Citrix has the most experience in the field, whereas Microsoft often proves to be the more affordable solution in most cases, especially for small businesses. Both solutions can be used with CAS genesisWorld.

## 1.2 Alternatives: Virtual Desktop Infrastructure (VDI) solutions

VDI solutions are comparable with Remote Desktop systems. The difference between them is that with VDI solutions there is no commonly used Windows installation, but instead each

user is assigned their own virtual desktop. The server runs multiple virtual Windows installations and then makes these available to the users using the thin client approach. As a result, this prevents a few problems and some of the costs that can arise with a multi-user environment as typically found in Remote Desktop systems.

Access to these virtual desktops is granted through service provider specific protocols such as those found in VMWare View or more classically through the Microsoft Remote Desktop Protocol (RDP). When using intelligent VDI management, the administration costs are comparable to the classic Remote Desktop systems, as fewer templates have to be defined, copied and made available to the chosen users.

Common solutions for virtual desktop systems include:

- VMWare Horizon View
- Citrix XenDesktop
- Microsoft Remote Desktop Virtualization

## 2 Reasons to use Remote Desktop solutions

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There are many different reasons as to why it is worth considering using a remote desktop solution. Reasons are wide-ranging and often independent of whether CAS genesisWorld is being used operationally. They also apply to the aforementioned VDI solutions.

### 2.1 Common motives

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- Cost of maintenance**  
Installations and updates are now carried out once per remote desktop system instead of for each client computer.
- Availability**  
Should a client computer crash it can simply be exchanged for another one, with minimal user disruption. The user's desktop is then available to any client computer.
- Data protection**  
All data can be stored physically on the Remote Desktop system. The client computers thus serve as input and output devices, and because they do not save data they do not present a security risk.
- Security**  
The Remote Desktop systems are not mobile, consequently it is easy to secure them both physically and logically. Direct access to sensitive data stored on internal systems, therefore stays internal minimizing any risks. Client computer access to the Remote Desktop systems can be configured using encryption, strong authentication, compliance checking and user restrictions so that client computers can still access the system while mobile without presenting a security risk.
- Remote Enabling applications**  
Many applications should not be used from a remote location, or via the Internet because

the communications can be insecure or unsuitable for remote use due to high bandwidth requirements or latency.

With Remote Desktop systems, however, these applications can be used as intended, because the application is installed on the Remote Desktop system and it communicates with the local internal systems.

□ **Operating system independence**

Depending on the Remote Desktop system being used (apart from client computers), it can be used with Windows and MAC OSX, Linux, tablets, thin clients or browsers

□ **Performance and resources**

Because they are usually more efficient in terms of resources, Remote Desktop systems score well when compared to individual client computers with respect to the performance per Euro ratio.

Additionally, Remote Desktop systems scale better than individual client computers, as they can be expanded when the demand for resources increases.

## 2.2 Reasons for implementing CAS genesisWorld together with Remote Desktop solutions

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In addition to the general arguments for using Remote Desktop solutions, there now follows a list of arguments on the particular advantages and benefits of using them with CAS genesisWorld.

### Remote Enabling

The architecture of CAS genesisWorld requires that there is a **direct** and **secure** connection between the Windows Client and the Application server.

#### **Direct**

Communications between the Client and Application server take place via Distributed COM with Windows RPCs. The type and manner of communications can cause performance latencies in the Client. This means that network delays affect both Client starting and the opening times for the individual windows.

#### **Trusted**

Client and Application server Windows systems have to be located in a common Windows domain. Windows users who are logged on to the Client have to be known to the Application server.

Delays can occur where there is a long or poor quality connection between the Client and the Server. Typically, this can be due to wireless connections such as LAN or UMTS, but also landlines running between distant locations. Unfortunately, a good bandwidth alone (gigabit) between two locations is not sufficient to prevent latency.

To ensure optimal performance, we recommend you use a latency of significantly less than 1ms, or in other words, the typical value found in local networks. You will notice a significant difference with respect to the performance for all values above this.

Typical values:

- LAN: <1ms
- Wireless LAN: 2-10ms
- DSL: 30-50ms
- UMTS: 300-400ms

You will notice individual differences in performance when using wireless LAN. And when using remote connections through DSL or UMTS you will definitely notice differences in performance.

Landlines should be categorized as falling somewhere between wireless LAN and DSL.

A Remote Desktop solution is usually implemented where trusted or direct, low-latency connections are not possible.

**Using trusted connections with Remote Desktop solutions**

Windows Clients on the Remote Desktop systems can access the Application server using a trusted connection. However, the Client computers can also access the Remote Desktop systems if the Remote Desktop systems are not in the same Windows Domains.

**Connecting directly using Remote Desktop solutions**

Remote Desktop systems can usually be found close to the Application servers, for example, using gigabit or 10GB connections at the same location. The application usually has a direct, fast connection at its disposal for communication purposes. Client computer access to the Remote Desktop systems can also be established using less suitable transmission lines.

The following overview illustrates and compares these two aspects.

	Only Client computers	With a Remote Desktop solution
Connection quality	Powerful connection between user computers and the servers	Powerful connection between Remote Desktop systems and servers.  User computers do not require a high performance connection.
Position of trust	Common user domains and	Common RD system domains and servers  Client computers should not be in a common domain together.

**Maintenance**

In the majority of cases, CAS genesisWorld updates consist of the Application server being updated, if this is the case, then all of your Clients will also have to be updated.

Depending on the type of update, it might require that you configure administrator rights on the Client computer.



There are a number of different mechanisms which help to make the automatic installation of updates a lot easier, for example, making MSI packages available for a software distribution, or using a Client Update service which allows the user to decide when they want to carry out the update and which also simplifies the update process.

Remote Desktop solutions have the advantage that updates only have to be carried out once per Remote Desktop system, which of course reduces the time involved in maintenance and system administration as well as greatly reducing the chances of any errors during the update process.

	Updating with a Client Installation	Software distribution	Update service	Remote Desktop solution
Cost	per Client PC	Low, depending on the solution being used for the software distribution	per Client PC	per Remote Desktop system
Error susceptibility	Medium, if normal users are involved	Low, depending on the solution being used for the software distribution	Low	Low
Restrictions	Windows administrator rights are necessary for users	Only the Client not including partner customizations or the Management Console	At the moment, there are only updates within the main version and partner customizations but not for the Management Console.	None
Use scenario	Only for a few Client computers	With a lot of Client computers	With a lot of Client computers	With a lot of Client computers

### 3 Specifics of Remote Desktop solutions

There are some specifics you have to be aware of when using Remote Desktop solutions, these specifics influence costs, functionality and other issues such as security and data protection.

### 3.1 Functionality

If an application is installed on a Remote Desktop system, then you will be able to use it within the framework of the environment available there.

This means that the application:

- Uses the operating system of the Remote Desktop system as its system environment. This is usually a Windows server version for VDIs this is at least a normal Windows version.
- Can access resources which are available directly on the Remote Desktop system. These are, for example, networked drives or printers situated in the same location as the Remote Desktop system.
- Can interact with applications which are also installed on the Remote Desktop system.

Depending on the Remote Desktop solution being used, you may also be able to access resources which are not directly available on the Remote Desktop system, but instead can be accessed via a redirection or, more specifically, a Client Redirection.

This enables the Client computer's drives, network drives, printers, USB devices and clipboards to be used on the Remote Desktop system.

Users often have questions on the following points which we have summarized for you here.

	Remote Desktop solution functionality
Using drag & drop from Explorer to CAS genesisWorld	Not possible. A local application cannot interact directly with an application on the Remote Desktop system.  Alternatively: Additional applications can also be used on the Remote Desktop system as remote applications can interact on the same Remote Desktop system by, for example, making the whole desktop available as a remote environment.
Printing from CAS genesisWorld	This is possible if the printer is connected via the network or via Client redirection and a suitable driver has been installed.
You can copy/move texts, images or files between the Client computer and Remote application using the clipboard.	This is possible if you have enabled transfers from the clipboard.
E-mail archiving from Outlook (local) to CAS genesisWorld (remote)	Quick archiving without using a dialog window is possible via the Web service, this means that the Microsoft Outlook add-in connects directly with the server.  Default archiving is not directly possible.  Alternatively: You can use Outlook directly on the Remote Desktop System or use the CAS

	genesisWorld e-mail view.
Opening .gbt files from a notification e-mail (local Microsoft Outlook) using CAS genesisWorld (remote)	This is possible if the .gbt files have been linked with a remote application. This is possible with Microsoft RDS and Citrix Xenapp.
Integrated telephony	<p>On the Remote Desktop system a suitable TAPI driver has to be installed which thus enables communications with the telephone system you are using.</p> <p>Using a Remote Desktop system has its own special challenges that have to be overcome. Basically, there are TAPI solutions available which are terminal server capable.</p>
Creating mail merges with Word (local) from CAS genesisWorld (remote)	<p>Not possible. A local application cannot interact directly with an application on the Remote Desktop system.</p> <p>Alternatively: You can use the additional applications on the Remote Desktop system as remote applications can interact with one another on the same Remote Desktop system.</p>

## 3.2 Licensing

CAS genesisWorld does not require special licensing if being used within the framework of Remote Desktop solutions. However, licensing remains user based.

This is, however, not the case for other applications. Additionally, you should consider the specific licensing for the operating system and the Remote Desktop solution.

Please bear the following points in mind when considering licensing:

**Operating system licenses**

One license per Remote Desktop. Depending on the edition you are using, size limits to the maximum amount of resources you can use such as the CPU and RAM.

**Client access licensing**

Per device or per user in a Windows domain, or organization. This type of license can be used on any number of Windows servers. Be sure to check your version though.

**RDS access licenses**

Per device or per user. These licenses are activated on a license server which, in turn, services any number of Remote Desktop servers.

**Microsoft Office**

Applies to each user who can log on to a Remote Desktop system. In this case, however, only volume licenses are permitted, which in general are more expensive than OEM - or Full Packaged Product Licenses.

- ❑ **Licensing for the special Remote Desktop solution**

For example, Citrix Xenapp

- ❑ **More applications**

Depending on the licensing model

When using virtualization you should consider the licensing. And when using Microsoft Windows Server Datacenter there can be, for example, any number of virtual machines installed without incurring additional operating system license costs.

Care is needed in the area of Microsoft Office licenses, you should pay special attention to costs.

The same applies with respect to licensing issues when using VDI solutions, even if other licenses are required at this point, for example, operating system licenses for virtual desktops.

### 3.3 Data protection and security

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If the database, Application server and Remote Desktop systems are all located at a secure location, then initially no data will leave the company, even if client computers access the systems via a Remote Desktop solution.

By using suitable restrictions, you can prevent data from being printed or from being copied to the clipboard or transferred from the original location to the client computer. In this case, the only way to output data is on screen, and the only ways to input data are via keyboard or mouse.

Options for additional data protection and security:

- ❑ Enabling/disabling the clipboard
- ❑ Enabling/disabling printing
- ❑ Restrictions to the preinstalled printer
- ❑ Enabling/deactivating access to local directories/network directories
- ❑ Enabling/disabling access to the locally connected devices (USB)

To maintain the same degree of data protection and security for locally installed CAS genesisWorld systems you should ensure that the user does not have administrator rights. In addition, you should establish the respective restrictions per group policy.

Additionally, you can also refer to the information on the **Replication** solution in the next sections.

## 4 Compared to other mobile solutions

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When deciding whether to implement Remote Desktop solutions it pays to create an overview of alternative solutions, especially:

- ❑ Locally installed clients

- Remote Desktop solution
- Replication
- CAS SmartDesign

In the table, you will see examples of comparison criteria. The weighting depends of course on your intended implementation scenario.

	Local client	Remote Desktop	Replication	SmartDesign
Online/Offline (availability)	Only at location	With Internet availability	Always	With Internet availability
Application functionality	Full functionality	Restrictions in case not all applications have been installed remotely	Full functionality	Fewer functions, increasing scope
Mobile device support	Microsoft Windows respective release notes	Client PC which the Remote Desktop Solution can use, for example, MacOS, Linux and so on.	Microsoft Windows respective release notes	Web browser respective release notes
Data protection and data security	Good, restrictions possible	Very good, restrictions easy to implement	Critical, data storage on the client computer, requires special security measures	Good, but restrictions are not possible.
Administrative costs	Solution dependent Software distribution low, otherwise tendency high	Low	Very high, particularly update and managing replication tasks	Low
Implementation scenarios	Can be used in one location, not mobile	Mobile users, home office, multiple locations, data center operated	Mobile users, home office, multiple locations	Mobile users, home office, multiple locations
License costs	Default	Specific licenses due to Remote	Default	Default

		Desktop solutions		
Hardware costs	Good client computers necessary	Good Remote Desktop systems but simple client computers	Very good client computers necessary	Basic through to good client computers necessary

A Remote Desktop solution is especially suitable if:

- more than one Remote Desktop strategy is already in place,
- remote usage is expected to be heavy,
- multiple locations wish to work on the same data stock without delays to a replication,
- software and hardware investments are tolerable.

## 5 Implementation scenarios

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To make decisions for or against the use of a Remote Desktop solution, the intended implementation scenario is very important.

Typical implementation scenarios include:

- Home office**  
Users work from home using company computers with DSL and VPN networks.
- Mobile users**  
Users work with company computers where the quality of the connectivity varies and where they may also work offline from different locations.
- Multiple locations**  
Users with permanent workstations each of whom works from a different location

### 5.1 Home office

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Typically, users have an uninterrupted Internet connection through which they can connect directly to their company network, however, this connection is not suitable for operating CAS genesisWorld directly, because of latency.

In this case, the Windows Client cannot be used directly on the home office computer, but instead, you either have to use a Remote Desktop solution or a replication. A replication is not strictly necessary, as offline capability is not necessary.

### 5.2 Mobile users

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Mobile users do not always have an Internet connection, however, these days the majority of users do. In each case, we do not recommend that this type of connection is used to operate CAS genesisWorld directly because of latency and stability issues.

And in such cases, the Windows Client cannot be used directly on the mobile computer, but instead must be used either with a Remote Desktop solution or a replication. A replication has the advantage here, of enabling access to the application even when an Internet connection is not available. You have to assess the pros and cons carefully here.

## 5.3 Multiple locations

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User locations can vary depending on an employee's role and whether or not they are office based or mobile or use a mix of both. Multiple users who are based in the office working at permanent workstations, usually work at just one of many possible locations. This includes users from other scenarios such as home office or mobile users.

A connection between locations is not necessary to run CAS genesisWorld directly, this is because latency is too high.

In this case, you would be better served using replication or a Remote Desktop solution or even a combination of different solutions.

A typical scenario is, for example, the installation of servers at the locations which replicate with one another at short intervals. Users at the locations work with their respective local servers.

If there are locations with specific conditions at which, for example, you do not want any server hardware to be located, then you can implement Remote Desktop solutions to resolve this.

For the home office user and the mobile user, a Remote Desktop solution is usually the best option, or alternatively a replication.

You will find the criteria set out above helpful when making a decision as what best to use.

## 6 Sizing and performance

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When using Remote Desktop solutions, you should consider the standard requirements that CAS genesisWorld has for a client computer, as well as requirements involving scalability where multiple users are involved.

However, it is worth double-checking your plans at this point, because often key aspects of the standard requirements are not considered. The most important of which have been outlined here.

### 6.1 Basic resource optimization at the client

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The following rules apply independent of Remote Desktop solutions when sizing your client:

**Single thread performance**

Multiple cores are sensible and good. However, CAS genesisWorld uses just one logical processor for a user action - that is one core. It is more important here to ensure that you

have the highest speed possible. You will find a good comparison of suitable processors online at: <http://www.cpubenchmark.net/singleThread.html>.

□ **Virus scanner optimization**

A virus scanner which is too active can pose problems for more than just CAS genesisWorld. This is particularly the case when caching data to the hard drive as this can affect the speed and stability. To prevent this, you should configure your exceptions accordingly.

□ **Saving energy**

Modern processors normally regulate the speed when demand is high. CAS genesisWorld can, under certain circumstances, function significantly worse than is normally the case. If this is the case, you can always set the energy profile to High performance and configure the computer's respective BIOS options accordingly or adapt the virtual environment to suit.

## 6.2 Additional settings for Remote Desktop solutions

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When implementing Remote Desktop solutions you should consider the following aspects:

□ **RAM sizing**

CAS genesisWorld requires approximately 250 to 350 MB RAM depending on usage. Obviously, the Remote Desktop system has to be configured accordingly. Take care to include the basic memory for the operating system in your calculations.

□ **CPU sizing**

In this case, Single Thread Performance, which was already mentioned above, applies. This is often overlooked with server processors and instead the number of cores is often taken to be more important. You should place the emphasis on strong cores.

□ **General sizing**

Here you should rather plan for more medium-sized Remote Desktop systems instead of just a few large ones. Thus, if a system fails, the overall impact is not as severe, and smaller systems, from a user point of view at least, are usually more powerful.

□ **Energy saving options**

You should always switch to **high performance** and disable the whole energy saving management features in the BIOS or the virtual environment.

- When using **E-mail views** in CAS genesisWorld you have to take the size of the mailbox into account when planning for hard disc storage, this is because CAS genesisWorld saves a copy of the mailbox locally by default. Alternative configurations are possible and are also best planned for in advance.

## 6.3 Specifics of virtualization

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Virtualization should help to reduce costs by consolidating resources. By using templates and centralized management tools you can also reduce the administration costs of your individual systems.



You still have to consider the sizing of your system when implementing virtualization within the framework of Remote Desktop solutions. Consolidating resources can quickly compromise the performance of the application.

You should be especially careful about using the following virtualization functions, or even consider avoiding them altogether:

□ **(Hyper-V 2012) Virtual Machine Queues (VMQ)**

With an unsuitable network card this will lead to greatly increased latencies.

Recommendation: deactivation

□ **(ESX) – Vmotion**

Momentary network outages can occur when moving virtual machines as a result of either manual or automatic triggering, this however, can have dire consequences for the future smooth operation of the application.

Recommendation: only use this during off-peak periods.

□ **(All) Over commitment**

Here resources are repeatedly assigned, this means that the system presumes that the resources will never be used simultaneously by all the virtual machines. In cases of excessive over commitment however, it can lead to the application not being able to cover its performance requirements. This is because it has to wait for the resources to be allocated which are currently being used by other virtual machines.

Thus, you should check regularly to see whether the total resources are still sufficient and whether the waiting times for the individual CPUs/cores are too high. Single thread orientated applications can suffer quickly when resources are tight as they may often have problems with the selected CPU.

Ideal: unique core allocations to virtual machines prevent over commitment.

□ **(All) Dynamic resources**

In this case, the main memory is only allocated as required. Unfortunately, no data is available in conjunction with Remote Desktop systems.

With Application servers we recommend you always allocate RAM permanently.

□ **(All) Number of CPUs**

Practice has shown that using more than 4 logical processors per Remote Desktop system does not bring any speed advantages. On the contrary, this often leads to losses.

Recommendation: allocate 4 cores.

□ **(All) Energy management**

From experience we know that reducing the CPU clock speed is not tolerated well.

Apart from in the Remote Desktop systems, we recommend that you configure the virtual hosts so that they can work at maximum performance. To do this, enable the following options in the operating system settings:

HyperV: set energy options to **Maximum performance**

VMWare: set energy options to **Maximum performance**

In the computer's bios set the respective settings to Maximum performance, and check that the various C-states have been deactivated.

## 7 More information

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- Citrix: <http://www.citrix.com/>
- Microsoft: <http://www.microsoft.com/>
- VMWare: <http://www.vmware.com/>
- Host Power Management in VMWare vSphere 5.5:  
<http://www.vmware.com/resources/techresources/10205>
- Four mistakes that can kill virtual machine performance:  
<http://searchservervirtualization.techtarget.com/tip/Four-mistakes-that-can-kill-virtual-machine-performance>
- A selection of single thread optimized processors:  
<http://www.cpubenchmark.net/singleThread.html>
- Licensing of Microsoft Desktop Application Software for use with Windows Server Remote Desktop Services: <http://www.microsoft.com/licensing/about-licensing/briefs/remote-desktop-services.aspx>
- CAS Consulting Partners with expertise in the areas of performance and Remote Desktop solutions: [www.emkada.de](http://www.emkada.de)