

iOra Geo-Replicator[®] and Best Practices for Microsoft Office SharePoint

Summary

This technical white paper discusses the deployment of iOra Geo-Replicator[®] Server-to-Server with Microsoft Office SharePoint Server. The paper provides a detailed overview of the iOra Server-to-Server replication process.

Geo-Replicator's[®] Server-to-Server solution uses Epsilon, a patented byte level differencing technology, to reduce transmission times of new portal content, each way, by up to 99%.

In a nutshell, this means that WAN users at remote locations have the same instant document access as LAN users at your corporate HQ – dramatically improving productivity across the enterprise by joining regional collaborating teams into one global group.

For distant office workers, or personnel dependent on remote servers, it's as if they were working on the headquarters LAN. Local server replication provides business continuity and LAN speed access, in SharePoint or other web applications, even when connection to the central server is completely lost.

About iOra

iOra's headquarters and primary software development laboratories are in the UK, with sales and support offices in the USA.

iOra's Geo-Replicator® product improves Microsoft SharePoint access for users working at the edge of military, commercial and maritime organizations. iOra's customers are supported by a team of experienced technical staff who ensure that our products are effectively integrated and supported within each client's organization.

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1. Introduction

Global organizations are struggling with the challenges associated with making SharePoint available to their dispersed employees and remote offices. The key challenge is to provide users with a consistent “SharePoint” experience and rapid access to critical content and collaborative applications. This must be done in a way that addresses the end user’s needs, while also being manageable from an IT perspective.

Accessing any web based application over an extended WAN typically introduces performance degradation for remote users. The need for LAN speed of WAN content grows as bandwidth resources are typically constrained. Without the provision of equality of service, deployments run the risk of remote users disengaging from the SharePoint platform which would jeopardize the corporate collaboration initiative.

2. Prerequisites

Server specific iOra Requirements

At least 1 GB RAM (2GB recommended if searching is to be enabled).

1.8 GHz CPU or above recommended.

64-bit windows server platform.

50 MB free disk space for the iOra Geo-Replicator® (IGR) Publisher software.

Sufficient disk space for log files. The publisher log files can take up to 50 MB of space with an additional 30 MB for each publication (a “publication” is a unit of replication).

Sufficient disk space to hold information about any iOra publications. This varies depending on how many iOra publications are published, and the size of the content.

Microsoft Windows Server operating system as required for Microsoft.

Microsoft .NET 4.0 Framework.

Network Specific iOra Requirements

The SharePoint server and IGR server should be linked by a high speed LAN. The iOra Publisher and Client communicate with services via HTTP/HTTPS and use the standard URL address of the SharePoint site, specified in the iOra publication, to determine the address of the web services.

IGR can transfer publication amendments between locations via HTTP/HTTPS, FTP or a file share.

For HTTP/HTTPS transfer of amendments, a webserver e.g. Microsoft IIS must be installed on the IGR server at each location.

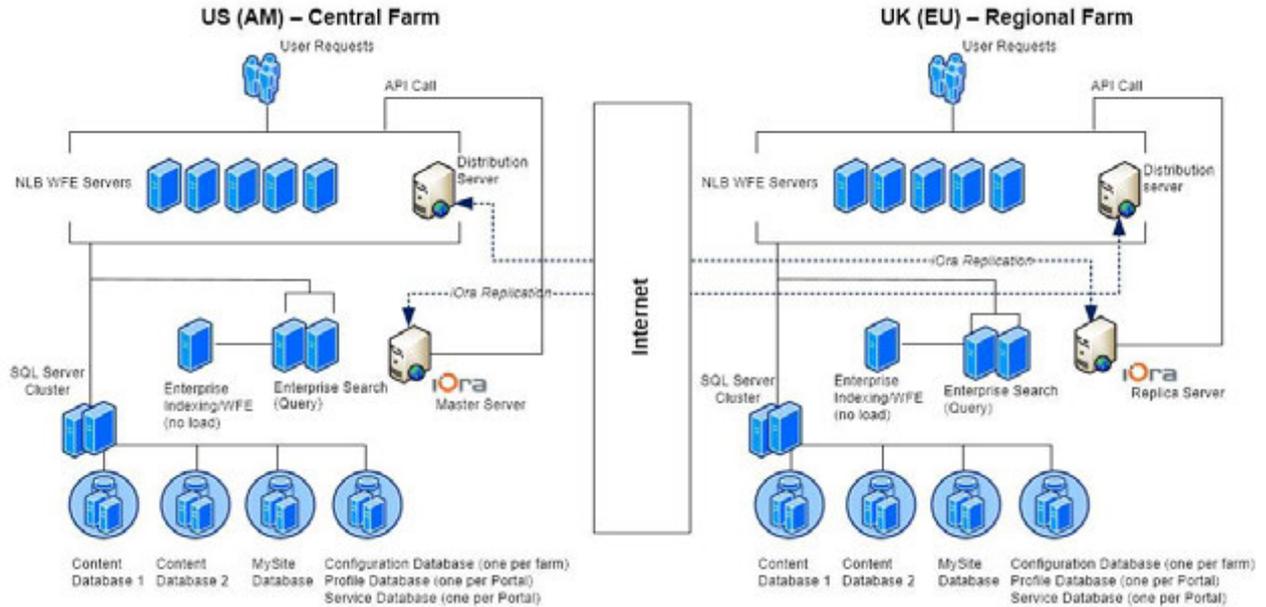
Each replica IGR Client must be able to have access to the server where the publisher amendments are located. The important point here is that amendments need to be located in a mutually accessible location.

For HTTP/HTTPS, the IGR Client uses the Internet Explorer settings from its local machine.

DNS Mapping can be used at a Replica Location to allow the local Replica SharePoint site to be accessed via the same URL as the Master site.

3. Deploying Prerequisite Components

Diagram of Server-to-Server Geo-Replication



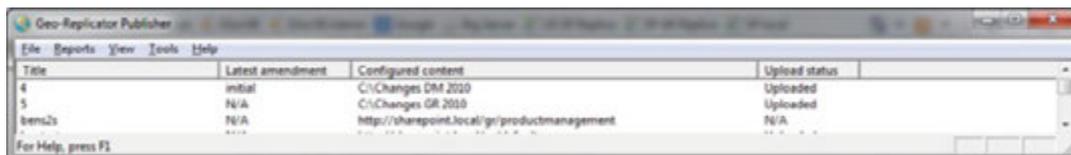
This section provides key pointers for deploying the prerequisite components. It will not cover the detailed steps required to install these components, as the Microsoft documentation, referred to in the References section, provides all the necessary information. However, there are certain tips and tricks discussed below that you need to be aware of.

The iOra software is composed of separate components, each performing a different role in the creation, management and update of publications.

3. Deploying Prerequisite Components (continued)

iOra Publisher

You use the iOra Publisher software to create publications, fill them with initial content, distribute them to the target computers, and generate and distribute amendments containing content changes. The iOra Publisher main window lists the publications you have produced and displays status information about them.



You can create new publications and work with existing ones. iOra Publisher provides wizards to guide you through these tasks. You use the iOra Publisher as the central tool for creating and distributing publications. In 2-Way mode, you install iOra Publisher to process publications on both the master server and the replica server environments. The Publisher can be co-located on the SharePoint server, but typically organizations install on a dedicated server with access to the SharePoint services.

iOra Client

iOra Client installs publications and applies the amendments (files that detail changes on the master server) distributed by the iOra Publisher to update publications. Typically the iOra Client operates in the background and master and replica server managers do not need to be aware of its presence. The Client is installed in an environment with network access to the SharePoint master or replica server. Installation of the Client is only required where updates to the locally installed SharePoint server are required. If the SharePoint configuration is being used as the basis for information to be broadcast to replicas without information returning, only the Publisher is required.

iOra Server Extensions

The server extensions are required to be installed to support the communication of the Publisher and Client components to the SharePoint platform.

iOra Web Services

The web services are required to communicate directly with the SharePoint server via its standard application programmer's interface. The web services are required to be installed on the SharePoint web front end.

These Publisher, Client, Extensions and Web Services should be installed in the order listed above.

4. Tips for Deploying iOra Server-to-Server Geo-Replicator®

Targeting Content for Replication

Before you undertake a replication program, initiate an analysis exercise that identifies the key structure and content that is required for replication. With potentially scarce bandwidth resources, you want to ensure that only data that is required in remote locations is replicated. Targeting the focus of your replication will also allow you to increase the frequency with which replication operates.

Establishing Replication Update Frequency

Typically organizations work to ensure that Server-to-Server replication operates in a network efficient manner. Generally it is unacceptable to schedule synchronization of servers on a minute-by-minute basis, except where the transport of data is mission critical. As part of the configuration process, it is essential that an update frequency is defined that not only ties in with the available network resources, but also addresses the update urgency required by the business. Defining the update frequency will in effect determine the closeness to 'real-time' replication and is therefore a constant trade-off against network efficiency. Scoping of replication should therefore include a clear definition of the data volatility, and as a result different replication units will all be replicated on different schedules. In addition, specific to SharePoint replication, it can be critical to ensure that the site is self-contained and not dependent on inherited information from other sites.

Dedicated Replication User(s)

Adding dedicated replication user(s) to the systems on the master and replicas allows you to restrict its access to certain non-replicable data and to help audit changes made to the systems. The Geo-Replicator Publisher and Client should be executed running as this user(s).

4. Tips for Deploying iOra Server-to-Server Geo-Replicator® (continued)

Pre-Filtering Replication Data

To make regular automated replication work, you want to leave open the opportunity for portal users to add, modify and delete content to either the replica or the master server. That said, the addition of significantly large inclusions have the effect of stalling the replication cycle because their sheer size cannot be processed as part of the scheduled replication cycle. Typically, organizations filter the content added to either the master or replica site to exclude specific file formats e.g. .mov, large structural additions, or files exceeding a certain file size e.g. 1GB.

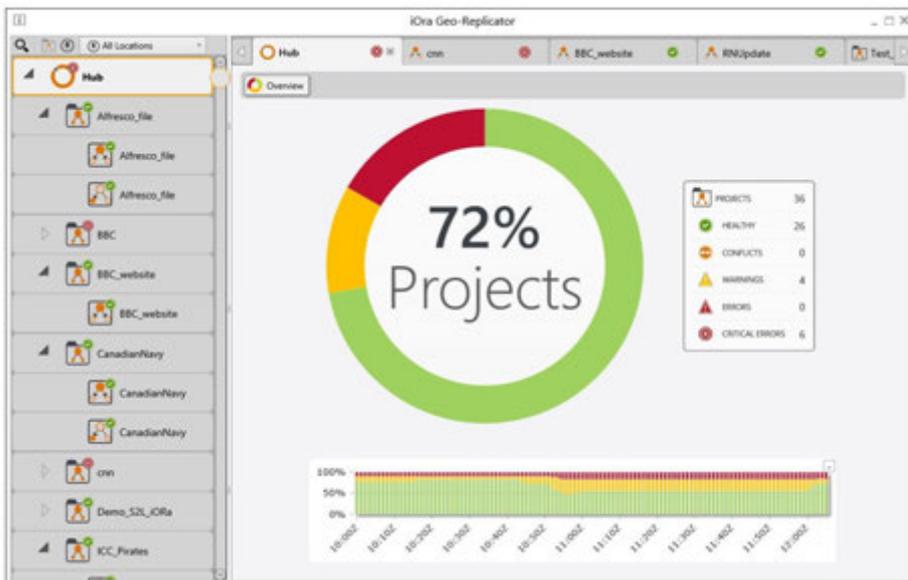
Monitoring and Error Handling

Usually organizations deploy replication so that it becomes an automated function that runs on a defined and regular schedule. Given that users rely on either the data that has been replicated from the master to the replica or vice versa, it is critical that any failure to replicate in turn automatically generates a warning detailing that for some reason replication has failed, and requires manual intervention. These approaches can be adopted:

Server-based - The failing server automatically generates an email that is distributed to interested parties.

Manually triggered - An update time stamp is included as part of the replicated content and it is the user that generates the warning when they determine that the replication cycle has not been executed within the standard cycle.

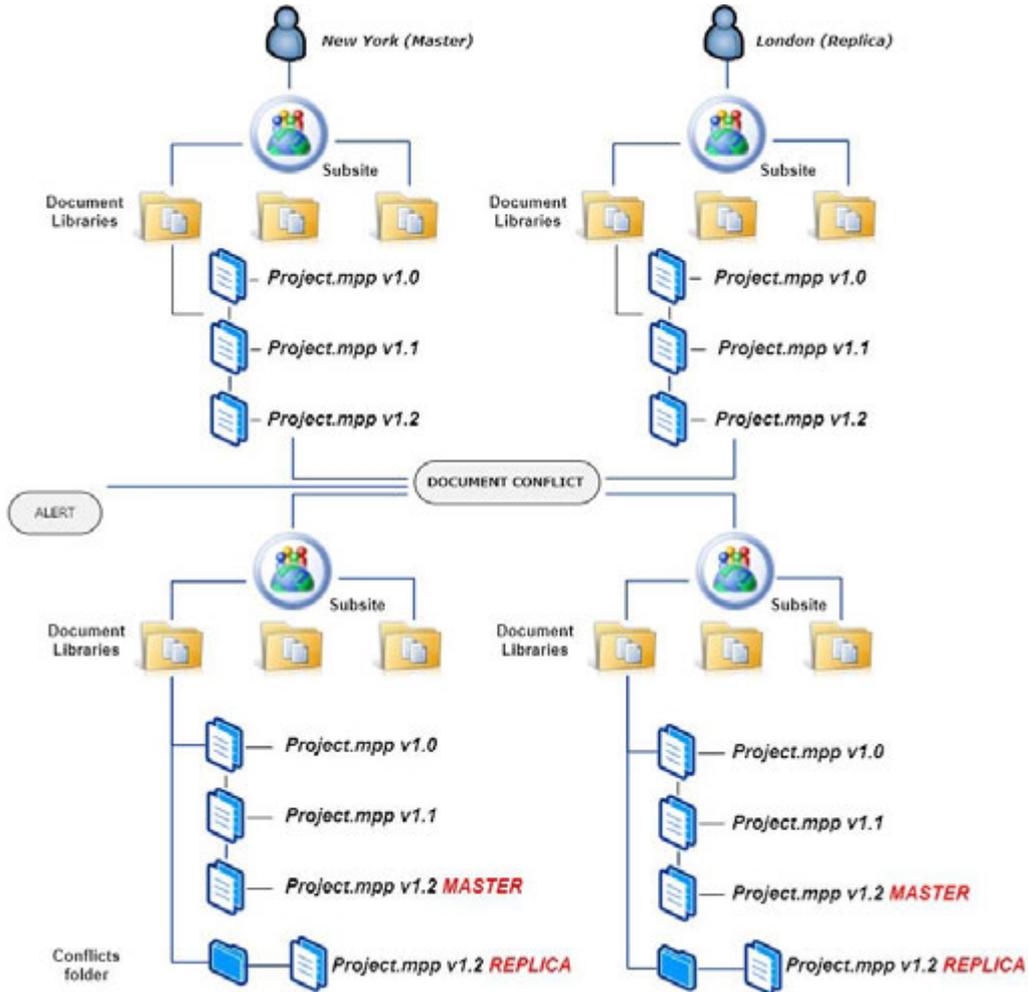
Monitor - The use of the iOra monitoring environment can dramatically support the monitoring process.



4. Tips for Deploying iOra Server-to-Server Geo-Replicator® (continued)

Automated Conflict Management

Document conflicts are unavoidable in a Server-to-Server replication scheme. These conflicts need to be managed by the replication engine to ensure that they can later be manually resolved by the contributing users. In structured deployments it may also be possible to automatically resolve the conflicting data by auto-merging content.



4. Tips for Deploying iOra Server-to-Server Geo-Replicator[®] (continued)

Replication Tracking to Continue Service in the Event of Primary Replicator Failure

Where replication constitutes a mission critical synchronization of data between operational servers, the replication engine needs to be able to be configured in a way that allows for continuation of operation in the event of the primary replication engine failing. For a replication solution to be able to hand over service to a secondary server the record of what has and has not been replicated to and from the master to the replicas becomes essential.

Maintaining Replication State for Continuation of Operation following Unexpected Service Disruption

Akin to all automated operations, synchronizing data replication must provide a trusted method of reconstructing the replication scheme after an unexpected system failure. Unexpected system failures are defined as the point where the network or operational environment becomes unavailable e.g. natural disasters, hardware failures, power interruptions, malicious intent etc. Key to restarting the replication process is the detailed record of the status of replication at the point of failure. Any ambiguity regarding the status of replication will call into question the validity of the replica as a copy of the master. Consequently the only method of re-establishing validity is to rebuild both master and replica from scratch or backup – a potentially disastrous option for a commercial enterprise.

In a geographically-distributed SharePoint architecture, failover to another farm is a viable option using a replication strategy. As Geo-Replicator[®] mimics the path of all replicated content beyond the server name of the web application, utilizing a single URL alias for all employees globally permits seamless operational continuity. Regardless of which SharePoint farm the end-user is accessing, they use the same URL for their SharePoint application. This URL is resolved by the DNS server in their local environment to redirect them based on their IP address back to the WFE or NLB address for SharePoint. In the event of a local outage of their SharePoint farm, the DNS server would have a secondary path to a replicated SharePoint farm in another region where the users would be re-directed. The application would be slower because of latency and available bandwidth, but would at least be available for use until the local SharePoint farm was restored to full operation.

5. Configuring iOra Custom Components

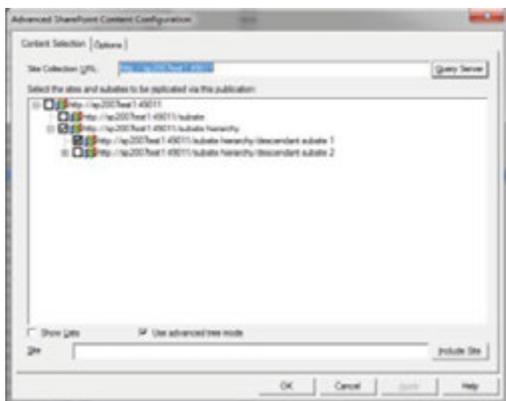
Deploying iOra Servers

To operate in 2-Way or bi-directional mode, you need to take care in setting up your system and in the sequence of building publications on the master then the replica and ensuring that they are logically connected.

In the steps below, you must use accounts with site collection administrator rights on the respective SharePoint sites when capturing or updating their content. This applies to the account you use when running iOra Client as a service and when running iOra Publisher automatically through the Windows Task scheduler.

Follow these steps to configure 2-Way mode set up:

1. Install the iOra software components and other system software required on both the master server and the replica server as defined in section 3.
2. On the master server, create a master publication containing the master content from your central content server. For SharePoint content, the account you use to create the publication must have SharePoint site collection administrator privileges.
3. For SharePoint content, configure an account with the same privileges on the replica server as you used to capture the content on the central content server.
4. Execute the master publication amendment on the replica server. This installs the master content on the replica server by directly interfacing to the locally installed SharePoint environment to create sites and structure, add content and define user rights and permissions.

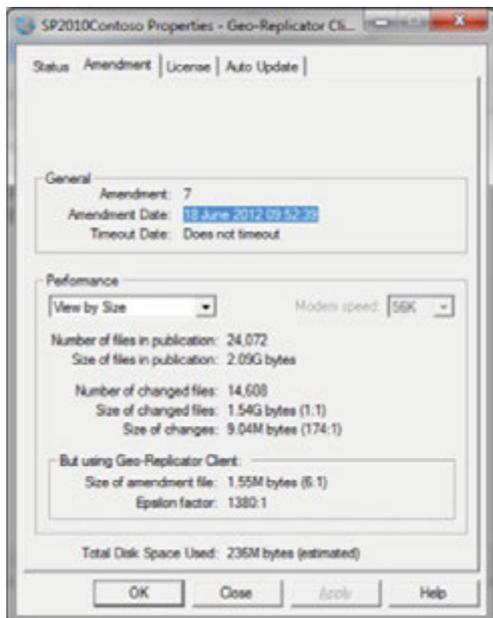


5. On the replica server, create a replica publication containing the replica content in exactly the same way that you created the master content as part of step 2. This definition will need to include the name of the master publication so that conflict resolution can be managed efficiently. The Publisher makes this a simple process by presenting the names of the already installed master publications for selection.

6. Execute the replica publication amendment on the master server. This establishes the 2-Way relationship between the central content master server and the remote replica server.

5. Configuring iOra Custom Components (continued)

Take these steps to configure 2-Way mode in day-to-day operation:



1. Schedule amendments to the master publication on the master server using the standard Windows Task scheduler and the iOra Publisher command line. Detailed left is a diagram illustrating the effectiveness of the embedded iOra Epsilon compression technology. The dialog reports that without compression 14,608 changed files would result in an update packet of 1.54GB. With Epsilon data redundancy extraction and compression the replication requirement has been reduced to 1.55MB. A key factor in successful replication is ensuring that replication is as efficient and bandwidth friendly as possible. *Note that in forthcoming versions of the iOra Geo-Replicator scheduling will be available directly in the product.*

2. Configure the iOra Client on the replica server to automatically check for updates on the master server. Choose a period between checks appropriate to the schedule you have set for amendments.

3. Schedule amendments to the replica publication on the replica server using the standard Windows Task scheduler and the iOra Publisher command line.

4. Configure the iOra Client on the master server to automatically check for updates on the replica server. Choose a period between checks appropriate to the schedule you have set for amendments.

After you have followed these steps, the iOra software will automatically:

- Record changes in the master content and amend the replica content accordingly.
- Record changes in the replica content and amend the master content accordingly.

The iOra software also:

- Ensures that all changes eventually converge to consistent content on all servers.
- Records any conflicts between files (that is, where the same file is manipulated on two or more servers within the same replication cycle).

Note: No amendment will be created at the regularly scheduled cycle time if no changes have been made on the source SharePoint environment since the last amendment.

6. Conclusion

This paper has provided a guide to set up a complete SharePoint and iOra Server-to-Server Geo-Replicator® solution in a worldwide farms deployment. This paper also covered the key scenarios encountered by end-users when looking for rapid access to critical content and collaborative applications. The Microsoft platform can be leveraged by partners such as iOra to deliver compelling applications to today's marketplace. To support enterprise replication in complex globally distributed organizations, any replication solution must be able to meet the following demanding requirements:

- **Performance:** Replace WAN response times with LAN response times e.g. reduce response times in excess of 5 seconds for opening and saving large documents to less than 5 seconds.
- **Cost reduction:** Minimize WAN traffic with advanced compression technology and enable web applications and file content to be replicated during off peak hours.
- **Transparency:** To avoid costly re-training of end users, or redevelopment of existing applications, all solutions must provide the same interface to the remote or mobile user.
- **Compatibility:** Support all file types, commonly used web technologies, network and security infrastructures.
- **Security:** Integrate replication support with the existing security infrastructure, and extend to support remote and offline users.
- **Scalability:** A scalable architecture that can manage tens of thousands of users and terabytes of replicated content.

Geo-Replicator® Server-to-Server replication technology is creating a new opportunity for companies to resolve existing connectivity issues, and is also enabling the deployment of systems which would not have otherwise been considered.

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For more information on how iOra Geo-Replicator
can help your organization, get in touch:

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