Global Solutions for SharePoint 2013

Global architecture refers to how Microsoft® SharePoint® Products are deployed to meet the needs of users within a large region or around the world. This model presents several common global architectures based on geographic location of users and content.
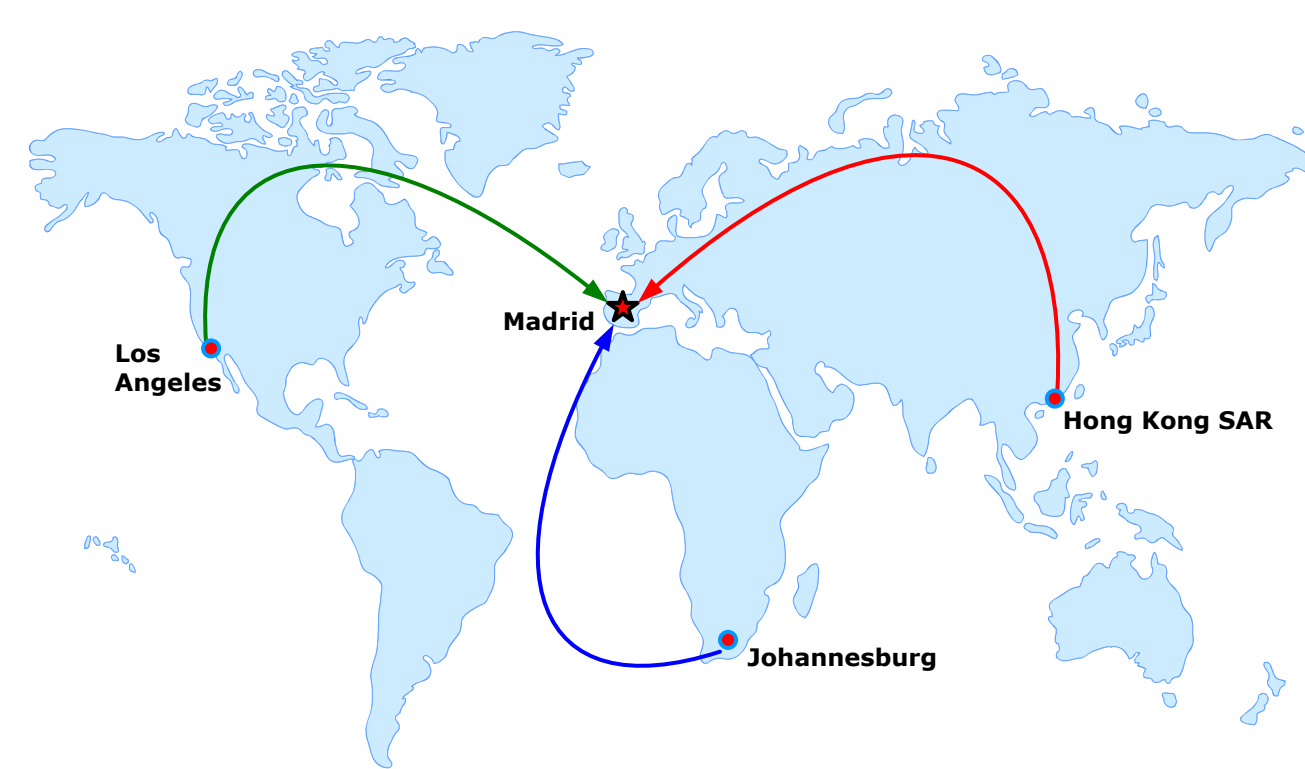
Key concepts include:

- **Central site** — The location that hosts the majority of company data and employee computers. In many cases, a SharePoint solution that is deployed to a central site can serve the needs of users who are spread across a region or around the world.

- **Regional sites** — Locations that host a subset of corporate data and employee computers that are connected by using a combination of LAN and WAN links. If your organization includes regional sites, you will have to decide how to include these locations in the overall global architecture. Several options are presented in this model.

- **WAN performance** — If you have users spread across a large region or located around the world, performance considerations to factor into your planning include:
  - **User response times** — The time it takes users to receive results from common SharePoint operations, including viewing a Web page, opening a document, and receiving results from queries.
  - **Content crawl times** — The time it takes to crawl content across a WAN.

SINGLE FARM SOLUTION

Central farm with users around the world

All SharePoint 2013 farm components and services are hosted at a central site. Users at remote sites access all sites and services across the WAN.

Los Angeles · Madrid · Hong Kong SAR · Johannesburg

This solution is the recommended solution for environments with adequate bandwidth and optimized networking infrastructure between clients and a centralized datacenter. If you support users across low-bandwidth connections located on multiple continents, it is important to evaluate the bandwidth and latency combinations for these connections along with the expected use of SharePoint 2013 (page sizes, file sizes, and usage patterns) to gauge how well a central deployment will serve your organization.

If users are unable to use the sites and services because performance over the WAN is too slow, consider deploying multiple server farms to regional sites. However, before scaling beyond the central solution, evaluate the ways in which you can optimize a central solution to improve performance over the WAN.

CLIENT SOLUTIONS FOR WAN ENVIRONMENTS

Several client solutions are available that can facilitate use of SharePoint 2013 across high-latency connections or in scenarios where connections are not always available.

Client solutions for WAN environments

	Mobile views	Office Web Apps	SharePoint Workspace for Windows Phone	OneDrive for Business
Slow network connections	✓	✓	✓	✓
Working offline			✓	✓

Scope of client solutions

	Mobile views	Office Web Apps	SharePoint Workspace for Windows Phone	OneDrive for Business
Document	✓	✓	✓	✓
List	✓		Limited*	
Library	✓		✓	✓
Site	✓			
Site Hierarchy	✓		✓	

*Limited — not all list types are supported

WIDE AREA NETWORK CONCEPTS FOR SHAREPOINT 2013

Investments for WAN performance

Wide Area Networks (WANs) is a key investment area for SharePoint 2013. Engineering work towards optimizing the Office 365 online experience also apply to the on-premises version. An Office 365 customer is deployed to a single datacenter nearest the customer headquarters. WAN performance investments are targeted at ensuring a good experience for all users of an organization regardless of where they are located. An on-premises deployment of SharePoint 2013 can also serve a worldwide user base.

Engineering improvements

- Better use of available bandwidth.
- Optimizations for utilizing client ports more efficiently.
- Image clustering and compression.
- IIS compression.

User experience improvements

- Content users care about comes first. Users do not need to wait for the entire page to render before viewing the content.
- Smoother page transitions with animation.
- Richer user interface with cleaner client-side rendering (such as interactive list sorting and client side filtering).

Bandwidth and latency testing

Variables that affect WAN performance include:

- Latency, measured in milliseconds (ms)
- Bandwidth, measured in megabits per second (Mbps)
- Packet loss and network congestion

Other variables, such as packet loss and network congestion also affect performance.

We recommend that you target a bandwidth range of 3 Mbps (Dual T1) or greater.

Product testing focused on two latency targets using a lower bandwidth:

- 125 ms latency and 1 Mbps bandwidth
- 300 ms & 1 Mbps bandwidth

Expected page load times for 125 ms latency at 1 Mbps bandwidth are:

- First page load—3-4 seconds
- Second page load—1.5 seconds
- Third page load—0.5 second
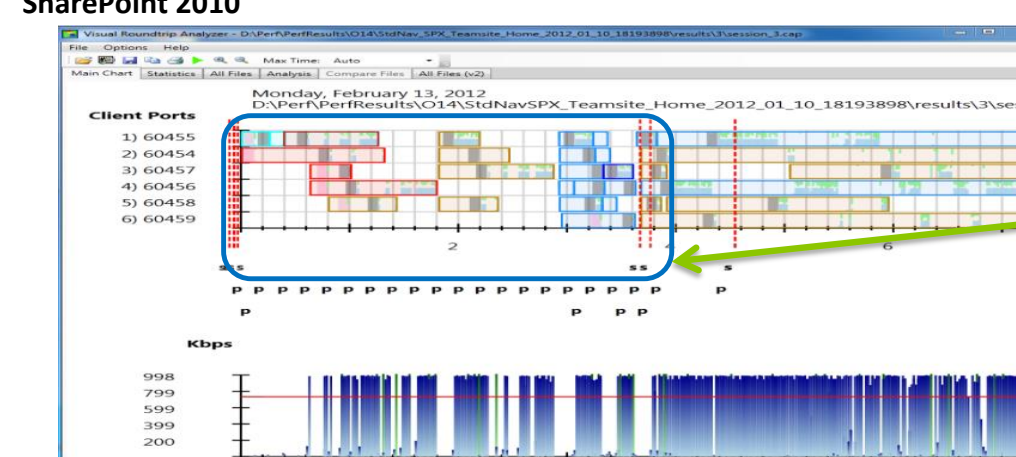- Subsequent page loads—1 second

Page load times at 300 ms latency are expected to be 2-3 times slower.

Download times (in seconds) for a 1.5 MB file at various latency and bandwidth combinations

Bandwidth (megabits per second)	Latency (milliseconds)					
	0	5	25	100	210	400
1,000	0.01	0.08	0.38	1.50	3.15	6.00
100	0.11	0.11	0.39	1.52	3.17	6.02
20	0.57	0.57	0.57	1.60	3.25	6.10
15	0.76	0.76	0.76	1.63	3.28	6.13
10	1.14	1.14	1.14	1.69	3.34	6.19
5	2.29	2.29	2.29	2.29	3.53	6.38
3	3.81	3.81	3.81	3.81	3.81	6.64
1	11.44	11.44	11.44	11.44	11.44	11.44
0.5	22.89	22.89	22.89	22.89	22.89	22.89

Red numbers indicate combinations in which latency begins to affect performance, in addition to bandwidth. Client port use is set to six ports for this test.

Version comparison network traces for Team Site (first page load time)

SharePoint 2010

Time to content ready
SharePoint 2013 delivers content quicker than previous versions.

Client port utilization
SharePoint 2013 uses the client ports much more effectively.

SharePoint 2013

Bandwidth utilization
SharePoint 2013 is more efficient in using available bandwidth, resulting in quicker ramp-up.

Configuration
1 Mbps bandwidth with 125 ms roundtrip latency.

Note: While WAN performance is optimized, the addition of social features to SharePoint Server 2013 add to the data throughput.

MULTI-FARM SOLUTIONS WITH EXAMPLE SERVICES ARCHITECTURES

Central farm with regional SharePoint deployments

Los Angeles · Madrid · Hong Kong SAR

In addition to a central site, regional sites also run SharePoint Server 2013. Users collaborate with local teams on the local server farm. Users access all enterprise-wide features across the WAN. The User Profile Replication Engine tool is used to synchronize user profile properties across the farms.

Deploying SharePoint Server 2013 at regional sites is recommended if the performance of WAN connections makes it difficult for regional users to efficiently use the central site and you are unable to optimize the central solution to improve WAN performance to acceptable levels.

The central-with-regional-sites solution provides local access to services that regional users are likely to use most—for example, collaboration sites and My Sites. It also provides local search for local content.

With this solution, you must decide how to incorporate regional content in search results. Options include crawling regional farms from the central farm, using result sources for remote farms to include remote content, or not including all regional content in enterprise-wide search.

Using the User Profile Replication Engine to replicate user properties across farms is necessary to preserve social features across the environment. The User Profile Replication Engine is not recommended for environments that include more than three farms.

Deploying multiple farms increases the complexity and operations costs of the overall solution. This solution also requires greater organizational coordination to build effective governance of content that is authored in multiple geographic locations.

Services planning includes deciding which cross-farm services to share across WAN links.

Cross-farm services support for WAN environments

Service application	Supported over WAN connections?	Notes
Search	Yes	
Managed Metadata	Yes	
Business Data Connectivity	Yes	After the data cache is populated, the WAN link is not needed. First-page browses are slow and might result in timeouts. Subsequent requests for cached data are faster. For best results, place the Business Data Connectivity service near the data that it consumes.
User Profile	Not supported	Using the User Profile service application across WAN links is not supported. This service requires direct database access. For WAN environments, the User Profile Replication Engine is recommended instead.
Secure Store Service	Yes	The Secure Store Service works across WAN links but is not recommended because it might negatively affect the performance of other services over a WAN link.
Machine Translation Service	Yes	

Additional guidance for specific service applications

Business Data Connectivity

- **Place Business Data Connectivity service applications close to the data** — Consider the location of the source system (for example a database or Web service) that this service application is connected to. Place this service application on the farm that resides closest to the data that it consumes.
- **Farms can consume from multiple Business Data Connectivity service applications** — A Web application can consume multiple instances of the Business Data Connectivity service application. This means that multiple Business Data Connectivity service applications can be located on different farms (based on where the data resides) and globally deployed farms can connect to as many Business Data Connectivity service applications as necessary.

Secure Store Service

- **Keep credential stores close to the applications** — Deploy the Secure Store Service, as needed, to local farms to maintain credentials for applications that are used by the local farm or a group of farms in the same region, regardless of where users are located.
- **Example** — An enterprise users can include the Secure Store Service that is used locally by the Business Data Connectivity service instance on that farm.
- **Example** — Other farms that are across WAN connections can each have a Secure Store Service that maintains credentials used by applications that are local to each farm.
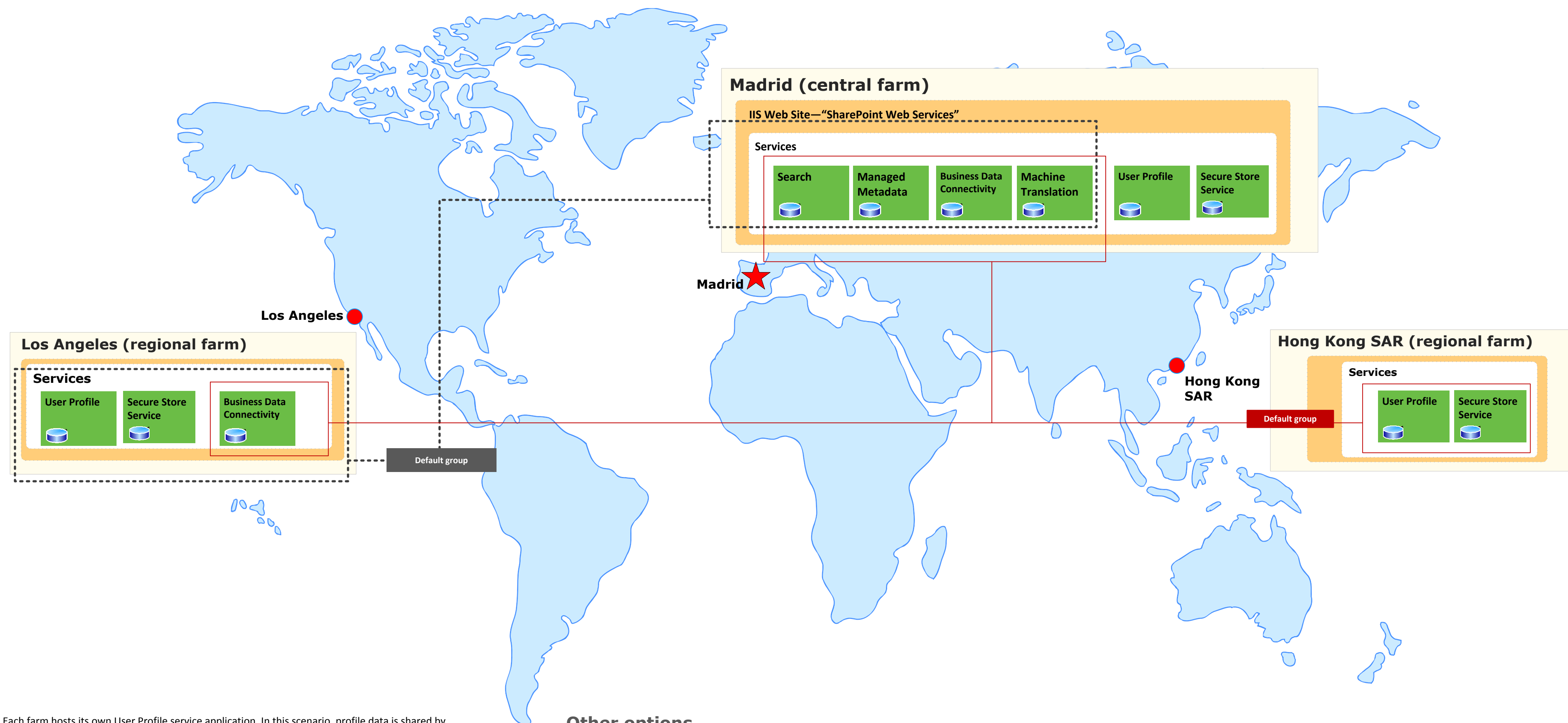
Decide how to include content in search results

Options for including global content in search results

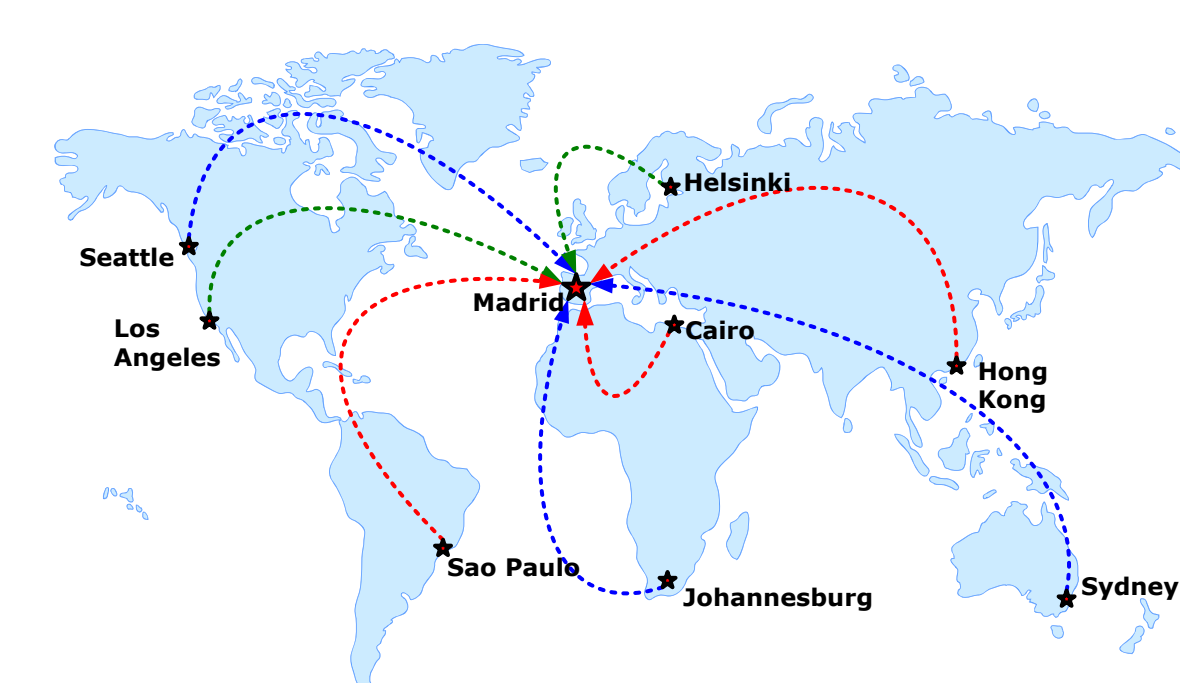|	Crawl over the WAN	Configure a result source for remote farms
Description	Content at regional sites is crawled from the central site over the WAN. You can configure separate crawler components to crawl content at remote locations and put these crawler components on separate crawl servers. Consequently, crawling over WAN connections can take place continuously without affecting the performance or time it takes to crawl other content.	Search is configured to return results from one or more remote farms (result source). In addition to the local farm. In this scenario, remote farms are crawled locally. Search at the central farm is configured to include results from the remote indexes. The remote farms can also be configured to include results from the central farm and other regional farms. This allows users to search from the local farm.
User experience	Users are presented with a single list of results.	Results are presented in in a single list. However, the results are grouped in blocks by result source. The number of results within each group is configurable.
Advantages	Search results are contained in a single search-ranked list. Search is managed centrally.	WAN crawling is not used. Search results are fresher. If remote farms are also configured with result sources for other farms, enterprise-wide search is available from remote farms as well as the central farm.
Disadvantages	Crawling over the WAN takes time and utilizes bandwidth. Search results might not be as fresh as if the content was crawled locally.	Users see multiple groupings of results. Search results are not ranked across the organization. Search must be managed at multiple

About this design sample

- The central farm (Madrid) provides the Search and Managed Metadata service applications and these are consumed by the regional farms.
- The Search service application is shared across the environment (from the central farm) and can be used in two ways:
  - The central farm can crawl regional farm content and provide enterprise-wide search results.
  - Regional administrators can configure Search to crawl regional content, as desired, to provide regionally scoped search results.
- Each farm hosts its own User Profile service application. In this scenario, profile data is shared by using the User Profile Replication Engine.
- My Sites are hosted at the regional farms and My Site redirection ensures that users only have one My Site on the farm that is closest to their primary work location.
- The Business Data Connectivity service application is deployed on several of the farms and shared across farms as needed.
- The Secure Store service application is deployed to each farm.
- Each farm hosts all needed service applications that cannot be shared across farms (not shown).

Other options

- If regionally scoped search results are desired, deploy the Search service application to regional farms to keep crawling local.
- Multiple instances of the Managed Metadata service application can be deployed and shared across farms, if needed.
- Cross-site publishing can be used to copy intranet content (such as company policies and news) to regional sites for read-only, local availability.

Madrid (central farm) — IIS Web Site—"SharePoint Web Services" — Services: Search, Managed Metadata, Business Data Connectivity, Machine Translation, User Profile, Secure Store Service

Los Angeles (regional farm) — Services: User Profile, Secure Store Service, Business Data Connectivity — Default group

Hong Kong SAR (regional farm) — Services: User Profile, Secure Store Service — Default group

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Central farm with many distributed SharePoint deployments

Seattle · Helsinki · Los Angeles · Madrid · Cairo · Hong Kong · Sao Paulo · Johannesburg · Sydney

Regional sites operate autonomously from other regional sites. This solution includes a centralized portal site, but the solution is not optimized for collaboration across regional sites. Regional sites can take advantage of SharePoint Foundation 2013 instead of deploying SharePoint Server 2013.

This solution is recommended for organizations that have many offices distributed geographically, such as branch offices. This solution provides local access to collaboration sites at the regional office in addition to access to the central site. It also provides the ability to share content between a regional site and the central site.

With this solution, you must decide how unified the search experience is. You can provide enterprise-wide search in which the central site crawls content on each of the regional sites. Or you can provide a more limited experience. Be aware that if SharePoint Foundation 2013 is deployed at regional sites, search at regional sites is scoped to the site-collection level.

Services planning includes deciding which versions of SharePoint 2013 to deploy at distributed sites.

Cross-farm services by product

Service application	SharePoint Foundation 2013	SharePoint Server 2013
Search		✓
Managed Metadata		✓
Business Data Connectivity	✓	✓
User Profile		✓
Secure Store Service		✓
SharePoint Translation Service		✓

About this design sample

- SharePoint Server 2013 is deployed at the central farm (Madrid).
- SharePoint Foundation 2013 is deployed at regional farms.
- The central farm Search service application crawls content at regional farms (represented by purple-dashed line) and provides enterprise-wide search to users who connect to the central farm for search.
- With SharePoint Foundation 2013, local-site-level scoped search is provided at regional farms.
- The Business Data Connectivity service application is shared across farms, as needed.

What is hosted for regional sites?

Feature	Central site hosts for regional sites	Regional sites with SharePoint Server	Regional Sites with SharePoint Foundation
Published intranet content	✓		
Aggregation of content developed at regional sites	✓		
My Sites redirection and profile synchronization (requires SharePoint Server at regional sites)	✓	✓	
Team or division collaboration		✓	✓
Read-only copy of published intranet content (optionally configured using cross-site publishing)		✓	
Farm-wide search for local content		✓	
SharePoint Foundation search scoped to the site collection			✓

Madrid (central farm) — SharePoint Server 2013 — Services: Search, User Profile, Managed Metadata, Machine Translation, Business Data Connectivity — Web application — Default group

Seattle (branch office farm) — SharePoint Foundation 2013 — Web application — Default group

Hong Kong SAR (branch office farm) — SharePoint Foundation 2013 — Default group — Web application

Sao Paulo (branch office farm) — SharePoint Foundation 2013 — Default group — Web application

Johannesburg (branch office farm) — Services: Business Data Connectivity — SharePoint Foundation 2013 — Default group — Web application

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