

The challenge: reliable access

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Access to many business web sites from overseas can be challenging due to the man-made network errors or events that impact dynamically URLs with unknown and unpredictable reasons. Even inside China, it can be difficult to ensure reliable access to Chinese web sites from all provinces.

This situation is explained in detail in the article "[China Internet: why is it unreliable and how to fix it?](#)" (in Chinese: "[威胁中国互联网的互联网“肠梗阻”，病根不是GFW](#)"). It is due to a combination of poor monitoring of Chinese Internet and rogue business behaviour by some internet service providers.

Most Chinese companies therefore rely on Chinese content delivery networks (CDN) such as [ChinaCache](#), [ChinaNetCenter](#) or [CDNetworks](#) to deliver content across China. Chinese CDN companies handle both relations with government and with Internet service providers to ensure reliable access to content.

Therefore, the first step for a non Chinese company to deliver its content to China with high performance and reliability is to subscribe to a Chinese CDN. This first step requires to get an ICP number in China, by opening for example a subsidiary in Shanghai Free Trade Zone (see article "[SMEs and the Shanghai Free Trade Zone](#)").

Then comes the next decision: host servers inside China.

Until now, there was only one solution: host servers inside China using a cloud provider such as [Aliyun](#) (not recommendable due to tricky ICP policy), [UCloud](#) (quite good) or [QingCloud](#) (our favourite). However, Chinese cloud providers are much more expensive, less reliable and less convenient than cloud companies such as Amazon, Rackspace, OVH, Digital Ocean, etc. Moreover, hosting inside China a copy of a web site that is also hosted outside China can lead to many issues in terms of data consistency, marketing or organisation problems posed by the management of a duplicate customer database.

This is why many companies would love to host their backend servers outside China on an affordable and reliable cloud provider and at the same time only manage a single database of users, of products, of content, etc.

We will explain here how this can be achieved.

Step 1: subscribe to a Chinese CDN

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The first step is to subscribe to a CDN provider that has a lot of edge nodes in China. ChinaCache currently has for example over 10,000 operations servers and 350 service nodes in more than 80 cities. However, CDN operation servers in China may suffer from congestion, slowdown or filtering each time they access servers outside China. Even if the CDN provider operates its own network outside China, there is actually no real guarantee that slowdown or congestion will not happen. For example, we have found that the native latency between servers hosted in Singapore (Amazon) and Guangzhou (QingCloud) is about 200 ms, although the distance between the two cities - about 2000km - would normally lead to a latency of 50 ms.

Step 2: add Grandenet and Cedexis

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We solve the issues described previously by combining Grandenet and Cedexis services.

Grandenet consists of two components: a couple of servers hosted inside China (UCloud, QingCloud) and a worldwide mesh network of about 150 servers (see article "[n-Order Re6st - Scaling Resiliency](#)").

Grandenet Servers hosted in China serve as real time replica of the backend servers. From a technical point of view, they are simply HTTP or HTTPS proxies. They are hosted in cloud providers and cities that are well interconnected to Chinese CDN providers.

Grandenet mesh network solves the latency, congestion and filtering problems between China and the rest of the world. For example, latency between Singapore (Amazon) and Guangzhou (QingCloud) is reduced to about 50 ms instead of 200 ms without Grandenet. Thanks to Grandenet, we can ensure that a replica of the backend is always available in China with near perfect connectivity to the backend outside China.

Cedexis DNS based routing solves the problem of resiliency of Chinese Internet (see "[China Internet: why is it unreliable and how to fix it?](#)"). We experienced for example that UCloud virtual machines that host Grandenet replicas tend to reboot about once every other month and become unavailable for a couple of hours. Thanks to Cedexis, CDN requests can be rerouted to Grandenet's virtual machine in QingCloud during the unavailability of UCloud.

One of the great benefits of the approach that we just described is that it can be implemented:

- using a single URL worldwide (inside and outside China)
- without changing anything to existing infrastructure
- without interfering with existing applications
- at moderate extra cost (Grandenet costs 400 RMB per month)

The only requirement is to hold a valid ICP license in China.

Business Applications

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The problems that happen for large web sites that require CDN also happen for business applications that usually do not rely on a CDN approach. A corporate extranet hosted in the HQ through a secure URL starting with HTTPS is usually unusable inside China. Users may have access for a couple of hours. Then access becomes irregular. After a couple of hours, the extranet becomes blocked either due to the man-made management or bad operations to detect and filter all encrypted content.

Grandenet and Cedexis for Business Applications

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We can use Grandenet and Cedexis here in a similar way. Grandenet is used to create secure replicas and to ensure real time, near perfect connectivity to the backend. Cedexis is used to route users to the most efficient replica in China. Through this approach, business applications become reliable everywhere.