

China Telecom

How China Telecom Sichuan delivered the impossible

China Telecom Sichuan overcame extremely demanding requirements to construct a dedicated video cloud network for a high-value customer, deploying an industry-first solution to form a cloud pool that linked multiple city video platforms with the provincial capital's video platform – all within an impossible timeframe.

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Dedicated networks for video

China Telecom Sichuan has enjoyed considerable business success by integrating IPTV, fixed broadband, and mobile broadband services and providing bundled packages for home users. From 2015 to 2018, China Telecom Sichuan doubled its home broadband and mobile service subscribers. After achieving stable growth in consumer and home services, China Telecom Sichuan gravitated to the enterprise market, hoping to exploit new business growth points in the B2B market.

In 2018, a high-value customer invited a bid to construct a dedicated video cloud network in Sichuan. The bid required a video platform of the provincial capital to connect to the video platforms of major cities in the province to form a cloud pool, with access possible through both the provincial and municipal video platforms. To serve Sichuan Province, which has a population

of about 90 million, the customer’s video cloud network has huge requirements on computing and storage resources, network access, and data center interconnection (DCI). With its wide optical network coverage, rich video platform operation experience, and strong construction capability, we were determined to win the project.

The customer required the data on the city video platform to be backed up on the provincial capital’s video platform, with authorized personnel in the provincial center able to access and manage data on the city’s video platform. Quick delivery was also a precondition; for example, in the first phase of the project, the customer asked the provider to connect the municipal video platforms with the video platform of the provincial capital within four months, so that the video platform of the provincial capital could uniformly manage the video data of all covered cities.

Given that IT system commissioning alone

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can take at least three months, this left just one month to provide high-bandwidth private lines – 20 Gbps bandwidth in the first phase – for cross-city interconnections between three video platforms: an almost impossible task.

Our cross-city MPLS private line services traverse two metro networks and one backbone network, spanning three cities. This required multiple teams to cooperate to complete service pre-handling and provisioning.

To complete service pre-handling, one provincial planning team and two municipal planning teams from China Telecom Sichuan needed to separately survey live network resources; check the availability and sufficiency of resources like transmission links, interfaces, and bandwidth; and manually design service paths and quality of service (QoS) metrics segment by segment.

To complete service provisioning, three O&M teams from China Telecom Sichuan had to run commands to operate each device hop by hop based on the planned service paths, and coordinate to implement E2E service testing and acceptance.

According to our experience, provisioning a cross-city 20 Gbps private line could be bottlenecked by insufficient bandwidth and take at least two months. It's extremely difficult to provision three 20 Gbps cross-domain private lines within one month.

How SRv6 Overlay works

To address these challenges, we required a lightweight cross-domain private-line solution that could achieve fast deployment and deliver reasonable returns. Therefore, China Telecom Sichuan and Huawei set up a joint innovation project team to explore new private line solutions. And we soon found one: SRv6 Overlay.

SRv6 Overlay enables fast provisioning by establishing an IPv6-based overlay service path that traverses the backbone network between the two end nodes, in the municipal and provincial DCs, of a private line. To do so requires just two PEs in each of the two DCs.

IPv6/IPv4 dual stack was enabled for all the routers on the metro and backbone networks, with more than 1 Tbps bandwidth reserved between the provincial metro network and

backbone network. Service provisioning can be completed by simply configuring the two end nodes, without the need to re-plan or modify the configurations on transit nodes. As a result, the private line provisioning period was shortened to just 1 to 2 weeks. Moreover, the deployment and O&M costs were much lower than those required for provisioning MPLS private lines, fully meeting customer requirements.

At the end of January 2019, China Telecom Sichuan had successfully deployed the industry's first commercial SRv6 site, realizing cross-city video service interworking.

SLA based on best-effort forwarding

Another concern was how this solution could provide a guaranteed SLA for customers based on best-effort forwarding without any reliable fast protection switching or bandwidth reservation mechanism.

To achieve this, we used Huawei's Network Cloud Engine (NCE) for online quality monitoring on the two end nodes of private lines. For several weeks, the NCE was configured to measure various metrics, including latency, packet loss rate, jitter, and availability. Because of the backbone network's high bandwidth, light load, and reserved bandwidth of higher than 1 Tbps, the latency, jitter, and packet loss rate of the private line were able to fully support video platform interconnection.

If the network becomes heavily loaded in the future, China Telecom Sichuan can simply upgrade a few key transit nodes and enable SRv6 Traffic Engineering (TE). If performance



deterioration due to, for example, congestion on certain service paths on the intermediate network, the given private line service can automatically select a non-congested service path through SRv6 TE. In addition, Huawei NCE provides latency mapping for users to collect segment-by-segment latency information about network-wide devices in real time, achieving latency-based path selection and traffic optimization under a committed SLA.

SRv6 in the full-service transport field

After several months of trialing commercial use, China Telecom Sichuan's proposed solution to construct a dedicated network for video was accepted by the customer and then expanded to multiple cities. SRv6 Overlay can provide fast, cost-effective, and committed services in scenarios that require rapid cross-city service provisioning and elastic real-time bandwidth adjustments, for example, cross-city cloud DC or IDC interconnections and cross-city, enterprise private line access to cloud. Featuring flexible deployment and a committed SLA, SRv6 supports various service scenarios, including government and enterprise private line, 5G transport, and home broadband scenarios.

SRv6 has now proven its value as a basic transport protocol for future fixed mobile convergence (FMC) networks. [www.huawei.com](#)