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How committing to risk management is powering fundamental growth

A State Grid branch partnered with Dell Technologies to build a backup and disaster recovery platform, boosting efficiency by over 200%.

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"Since the backup system upgrade was finished, a full backup can now be completed in 11 hours. The archiving process is accelerated, with big data backup efficiency increased by over 200%. With the PowerProtect DD6300, the backup speed can reach 8.5TB per hour, and the logical capacity can be increased to 1.8–8.9PB, with nearly a threefold improvement in backup performance."

Provincial Branch Project Manager,
State Grid Corporation of China

Business needs

To ensure the secure and reliable operation of China's electrical grid, a provincial branch of the State Grid Corporation of China (SGCC) collaborated with Dell Technologies to establish a five-in-one modern data security defense system comprehensively covering hazard detection, data protection, security surveillance, rapid response and business recovery.

Business results

• Improves the effectiveness of the power grid data security system.

• Accelerates data backup, with a 200% improvement in backup efficiency.

• Reduces system TCO by 30–40% and boosts the deduplication ratio to 26:1.

Solutions at a glance

• Dell PowerProtect Cyber Recovery

• Dell PowerProtect DD Series Appliances

• Dell ECS

• Dell Data Protection Suite

• Dell ProSupport Enterprise Suite

The convergence of digital transformation and power grid demands has triggered a data revolution amid the rollout of Internet of Energy (IoE) strategies. Multidimensional power marketing data draws on internet technology to collect and employ data about social, economic and production activities as well as people's everyday lives — creating a new type of national strategic resource.

As one of the backbone enterprises serving the national Beijing-Tianjin-Hebei Integration Plan, the provincial branch of SGCC — China's state-owned electric utility serving more than 1 billion people — has been actively involved in the development of the Xiongan New Area, located about 60 miles southwest of Beijing. This State Grid branch has been working to pioneer IoE development and champion carbon neutrality by limiting carbon emissions. This will require major breakthroughs in comprehensive energy utilization, vehicle-network interaction, direct current (DC) grid ecosystems and the commercialization of China's BeiDou Navigation Satellite System.

To this end, the State Grid branch has accumulated a massive amount of data on power marketing and production management. The power grid is a central part of China's national infrastructure. An attack on it could lead to serious social consequences. To ensure data security, the provincial branch turned to Dell Technologies for Dell PowerProtect Cyber Recovery cyber resiliency and Dell PowerProtect DD series appliances for backup and recovery. The branch has deployed a complete disaster recovery system capable of providing data protection at various SLA levels for its data center's business systems, depending on each system's importance.

Guaranteeing availability of business systems

The State Grid branch proactively worked to build a next-generation digital infrastructure and highly flexible power grid, implement source-network-load-storage integration and build multi-energy source complementary systems, in addition to rolling out a power system focused on new energy and a power marketing management information system.

The branch's leading-edge electricity marketing management information system facilitates innovative marketing management efforts among individual power supply units

leveraging the same IT — providing high-quality and efficient services for the general public while elevating marketing management. System data primarily consists of marketing and customer service, marketing operations, marketing work management and marketing decision-making support.

Prior to the Dell Technologies solution, the previous data backup system was rapidly becoming obsolete — no longer able to perform high-speed data backup and recovery. As a result, essential business continuity in the face of a catastrophic station-wide event couldn't be guaranteed. The State Grid provincial branch deployed PowerProtect Cyber Recovery with CyberSense to safeguard and isolate its data from ransomware and other cyberthreats. In addition, the branch installed the Dell Data Protection Suite with two sets of DD6300 devices to provide local backup for business operations and replicate vault data onto an off-premises safe-haven destination device.
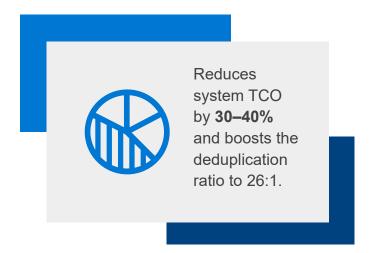
PowerProtect DD appliances are equipped with Intel® Xeon® processors. The devices offer rich and complete command sets for data processing programs, together with improved parallel multitasking performance to ensure the reliability and efficiency of data management. The DD series has proven effective in supporting data computing, storage and transmission — helping to build a flexible and efficient data platform that's a catalyst for transformative change.

Improving archiving and big data backup efficiency

The State Grid branch actively promotes utility customers installing smart meters and other devices. This has greatly expanded the collection range of power grid operation data and electricity consumption information. Combining traditional electricity marketing services with massive data resources has created a need for data mid-end platforms. It's also led to the proliferation of converged centers of various data resources to share, analyze, mine and fuse unstructured data horizontally across fields and vertically across levels.

The branch built a modern digital business structure to streamline data collection from websites, mobile apps, WeChat mini programs, financial systems, product systems and customer management systems. In addition, it integrated data resources across the various levels and fields on the data platform. Currently, over 40TB of unstructured data has been collected. Faced with such a tremendous volume of data, the branch opted

Reduces system TCO by 30–40% and boosts the deduplication ratio to 26:1.

for Dell ECS enterprise object storage for cloud-based, large-scale data capture, storage, protection and management to unleash the full potential of electricity usage big data resources.

ECS features a horizontally distributed architecture, supports global site connections and offers a high degree of scalability and flexible access — making it ideal for the data mid-end platform. It also supports S3, S3a and NFS protocols, and its exceptional interoperability allows the IT department to quickly build multipurpose data lakes. The State Grid branch has already implemented cloud-based data storage to accommodate intensive power grid management and ensure smooth and secure power supplies.

Archiving unstructured big data is critical to the success of the process. For the massive amounts of archive logs generated on a daily basis, it took the old backup system more than 24 hours to perform a full backup, and the excessive processing load had a serious impact on production operations. Since the backup system was upgraded, full backups can now be completed in just 11 hours. Accelerated archiving also boosts big data backup efficiency by more than 200%.

Furthermore, with the DD6300 series solution, backup speeds can reach 8.5TB per hour, and logical capacity can be increased to 1.8–8.9PB, with nearly a threefold improvement in backup performance and a success rate of 99.9999%. The concurrent backup speed of the DD6300 appliances deployed in the production center can reach 3,000–4,000MB/s, so the backup of the data collection, intelligent diagnosis and other important business systems can easily be completed within the specified time limits.

Combating cyberattacks and reducing business risks

Electricity marketing involves managing newly installed generators, capacity expansion, and changes in power consumption, contracts, electricity consumption volumes and fees, billing and accounting, electricity metering and power loads — as well as maintaining orderly power consumption. So naturally, the data involved is critical. Even a minor data error could pose severe challenges to marketing activities — obstructing and prolonging business processes, impairing customer service quality and making it difficult to estimate complaint processing times. It can also be impossible for marketing decision-makers to analyze the information flow across the customer service layer, marketing business layer or the marketing quality management layer, resulting in serious business risks.

In collaboration with Dell Technologies, the State Grid provincial branch built a data protection system to defend against cyberattacks, with useful features ranging from hazard detection, data protection, security checks and rapid response to business recovery. Hazard detection primarily involves embedding programs into the asset management and business environment detector systems to accelerate risk assessment and customize risk management strategies. Data protection involves using Cyber Recovery to review access control and data integrity. Security checks also rely on Cyber Recovery to block malicious data parsing and track abnormal events. In addition, Cyber Recovery plays a key role in conducting security investigations and executing rapid response and data recovery plans. This highly effective protection system enables the branch to reduce business risks by effectively preventing ransomware attacks.

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Reducing system TCO by 30–40%

The powerful deduplication capabilities of the PowerProtect DD series appliances have increased the data compression ratio to 26:1, optimizing storage capacity and data backup capabilities. What's more, the appliances have reduced the space required for backup equipment in the server room by 50%, slashing the TCO of the branch's backup and disaster recovery system by 30–40%.

The branch uses PowerProtect DD to perform deduplication and then send the data through a WAN to the data center, greatly reducing bandwidth resource usage. Doing away with tape backups in favor of internet-based offline backups has decreased backup manpower requirements by 70%. In addition, it enables seamless off-site backups employing the D2D backup approach, using the existing network to perform low-bandwidth data replication. This has significantly reduced data transmission loads on the network, making it easier to protect critical data in the new environment.

The Dell Technologies service team provides State Grid's front-line IT staff with regular technical consulting services, as needed. During the project's initial stage, the Dell Technologies technical team helped optimize the old backup server system. System software vulnerabilities were promptly fixed, and the operating system was patched and updated.

The technicians removed the direct connection between the backup host and backup storage equipment and used proprietary protocols to implement encrypted data transmission and backup data encryption. Today, the system replicates the data to the branch's PowerProtect Cyber Recovery vault and enables automated cyber resilience isolation via air gapping to minimize the risk of cyberattacks. Cyber Recovery scans the data, uses AI-based machine learning and other algorithms to detect any incomplete, corrupt or encrypted data, and generates corresponding analysis reports. The PowerProtect DD series appliances offer a lossless data architecture equipped with RAID protection, hot spare disk, NVRAM power failure protection, snapshot and file system self-healing features — ensuring end-to-end data integrity and 100% recoverability.

Going forward, the State Grid provincial branch will continue to innovate and transform its operations and provide high-quality data services while maintaining stability and striving to complete high-priority tasks without exceeding budgets. The branch expects to contribute to State Grid's national strategies of carbon neutrality and the Beijing-Tianjin-Hebei Integration Plan, and it will continue to expand digitalization and build new growth engines for its primary electricity businesses. And always, stability and security will be rigorously maintained through enhanced risk awareness and strong defenses against threats to ensure the bottom line of preventing major data risks.

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