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Case Study | Google Earth Enterprise

Google Earth Enterprise Enables Proactive Disaster Management for Directorate General of Highways, MOTC, Taiwan

At a Glance

What they wanted to do

- Develop a single, easy-to-use platform to store and access information needed for emergency preparedness and response, decision making, and forward planning

What they did

- Selected Google Earth Enterprise for its hybrid cloud-based mapping solution that provides important on-the-ground information for disaster preparedness and recovery

What they achieved

- Established an all-in-one disaster preparedness and response system called SafeTaiwan to keep abreast of crucial real-time information
- Developed a web-based system that was secure and accessible by the public and DGH employees on mobile devices and desktops
- Standardised data presentation for 19 government agencies and private companies for more effective inter-agency coordination and decision making

"We sought a single platform with mapping capabilities that automatically integrates all the information needed to better prepare for and respond to emergency situations. We also wanted to make the platform available to the public for communications on public safety."
—Director Chen Shou-Chiang, Directorate General of Highways

Background

The Directorate General of Highways (DGH), Taiwan, governs the construction and maintenance of over 7,000km of highways, 4,000 bridges and 200 tunnels. The agency also provides Motor Vehicles Administration services such as issuing of driver licenses and the general maintenance of traffic safety for the public.

Challenges

Geographically situated in the Circum-Pacific seismic zone, Taiwan commonly experiences natural disasters such as earthquakes, landslides, typhoons and heavy rainfalls, especially during the monsoon seasons. DGH realised that its response time to disaster sites can be significantly reduced if only it had timely information of situations on the ground.

DGH used to rely on civilian drivers and news media outlets to alert them to any accidents or disasters before dispatching crew to the affected areas. This passive approach did not allow DGH to provide immediate response when needed, even though dispatch and rescue teams were operationally ready to handle disasters and distress calls anytime.

Separately, DGH uses third-party information from 18 other government agencies and private companies to help in its decision-making. Due to cumbersome administrative procedures, delays in obtaining information hindered DGH's ability to access crucial information and conduct proactive disaster prevention.

Director Chen Shou-Chiang, who is in charge of the Information Management Office of DGH said, "We sought a single platform with mapping capabilities that automatically integrates all the information needed for better emergency preparedness and response. We also wanted to make the platform available to the public for communications on public safety. "

Solution

In 2010, DGH utilised the free version of Google Earth to build a web-based platform called thb-GIS (Geographic Information System). thb-GIS consolidated numerous datasets relating to safety and disaster prevention. However, the free version of Google Earth does not allow DGH to control access rights to the databases. DGH wanted to provide its more than 1,000 employees with varying levels of access, according to their job functions. This is a feature only supported by the enterprise edition.

"We wanted to provide citizens with access to some of the information regarding public safety. Google Earth Enterprise is the only solution that can offer us the flexibility to define seven distinct access rights based on a hybrid cloud infrastructure model," commented Chen.

DGH also needed a solution that could overlay images, terrain and vector data over the map of Taiwan in a secure and efficient environment to contextualise information in the event of emergencies or disasters. This would facilitate faster decision-making and emergency response.

About Google Earth Enterprise

Google Earth Enterprise allows you to store and process terabytes of imagery, terrain and vector data on your own server infrastructure, and publish maps securely for your users to view using Google Earth desktop or mobile apps, or through your own application using the Google Maps API.

For more information, visit
www.google.com/enterprise/mapsearth

"With a single easy-to-use SafeTaiwan portal displaying clear and dynamic visual representations of the events on the ground, we can now accurately determine the magnitude of disasters and decide the best course of action quickly."
—Director Chen Shou-Chiang, Directorate General of Highways

Comprehensive tests were conducted. DGH worked with GeoForce, a Google Enterprise Partner, to trial the solution and determine if Google Earth Enterprise would be able to meet the stability, performance, security and user-friendliness desired.

"We were initially concerned about security as sensitive information will be stored in the same repository. However, the trial assured us that there are adequate security measures to prevent unauthorised access to the database," said Chen.

Confident that Google Earth Enterprise is the right solution for them, DGH and GeoForce began developing SafeTaiwan, a platform that overlaid crucial data used in emergency response to a map of Taiwan. This gives DGH a rich visual dashboard that immediately provides insights for better decision-making and risk management.

Results

Powered by Google Earth Enterprise Engine, SafeTaiwan allows DGH to monitor road and bridge conditions in real-time. Infrastructure locations are marked using a colour coding system that corresponds to the current conditions in the area, such as red for severe, orange for alert, yellow for caution and green for normal. This is combined with live video footage linked to over 2,800 CCTVs country-wide, providing officials real-time conditions that help them prioritise responses.

Chen said, "Previously, it would take us hours to accurately determine the magnitude of the disaster as we had to rely on the public for updates. With real-time visibility, we can now quickly decide and block access to the affected roads and bridges to ensure the safety of road users. This was not achievable prior to Google."

The new solution also allows DGH to learn from past events. Archived datasets are used as inputs to develop more effective disaster preparedness plans. The structural strength of infrastructure such as roads and bridges can also be accurately assessed.

"If we noticed a strip of road or bridge that has been repaired in a past disaster being damaged once again during another emergency, we know that the infrastructure is not structurally sound. We will then relook at how we can strengthen it, to reduce recovery cost and time as well as improve public safety in future disasters," Chen reflected.

While earthquakes are hard to predict, other natural disasters such as typhoons and heavy rains are easier to identify with the help of global weather intelligence from government partner agencies. For example, the Taiwan Cooperative Precipitation Ensemble Forecast Experiment (TAPEX) has been commissioned to provide typhoon predictions to related agencies. Rainfall readings collected at ten-minute intervals are displayed on Google Earth Enterprise's dashboard to forecast approaching disasters such as typhoons and flash floods. Warnings signals are then sent out through SafeTaiwan to alert the public and agencies concerned.

"Google helps us create a comprehensive repository that standardises and pools data from all the agencies to realise a safe Taiwan. The success of SafeTaiwan has been very encouraging. The positive feedback gathered from users, both within the organisation and the public, has spurred us on to continue developing the platform. Our vision is to expand the boundaries of this solution to integrate and share data from around the region for greater cooperation in disaster preparedness and recovery efforts," concluded Chen.

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