EM-LINK sharing spatial data: an example of collaboration in emergency management

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In the midst of the 2019–20 summer bushfires, responders on the ground and in incident management teams were feeding information into state-based mapping systems. At the Crisis Coordination Centre (CCC) in Canberra it became apparent that a single, national feed showing bushfire boundaries - which did not currently exist - was urgently required.

Given the active bushfire crisis, state and territory jurisdictions did not have the capacity to build bespoke bushfire feeds for the Australian Government. The CCC approached EM-LINK[1] to receive the bushfire boundary feeds from the jurisdictions that had them and to perform a gap analysis of jurisdictions that needed urgent support to produce a temporary bushfire boundary feed.

Responding to an identified need – the beginning of EM-LINK

After Black Saturday in 2009 and the recommendation to share emergency management spatial data, Common Operating Pictures (COPs) were developed across Australia to allow multiple jurisdictions to access a single identical display of information. There was a need for spatial data that could be applied to a range of spatial systems and allow agencies to visualise both the incident and the associated warnings information.

With large-scale fires and floods occurring at a higher frequency, it became important for there to be visibility at the national level of incidents beyond an incident point. Australian Government agencies were unable to see the extent of the impact, especially if it crossed jurisdictional borders. This hampered the national response in providing resources and financial assistance to regions and affected communities.

In 2012, Emergency Management Spatial Information Network Australia (EMSINA) led a project to bring together the incident feeds from states and territories into a National Situational Awareness Tool (NSAT) that was available to chief officers and Australian Government agencies. Emergency management agencies provided their bushfire incident points, bushfire areas and warning points. Over the years, the data provided by agencies grew to include some flood data and a range of other emergency management related datasets.

From NSAT to EM-LINK

The NSAT allowed emergency management agencies to access data feeds from neighbouring jurisdictions to provide visibility on current incidents and assess their potential threat. During incidents, data custodians are often involved in operational response, so it is difficult for other agencies to access specific datasets.

In 2017, at the request of Emergency Management Australia (EMA), Geoscience Australia translated NSAT from a static document that was manually updated once per year, into an online platform that allowed agencies to log in and maintain their data feed records and links in the system. This made the system much more current and allowed other agencies to access the restricted data easily in a range of formats to include in their own systems. The new catalogue was rebranded as EM-LINK.

Emergency management data in EM-LINK is catalogued into themes including bushfire, flood, cyclone, biohazard, weather, earthquake, tsunami, volcano and multi hazards. This has allowed users to see their neighbour's incident feeds for a shared situational awareness, facilitating informed and consistent decisions based on the same authoritative data. Users are able to subscribe to themes to be notified of new data becoming available. The spatial feeds are presented in a logical and searchable manner. Each hazard type has a page and the web services available are grouped by state or jurisdiction. Additional supporting spatial data is provided which includes base maps, exposure information and links to tools and open data sites.

How EM-LINK assists emergency managers

Emergency management jurisdictional data contacts are usually operationally focused during times of emergency. EM-LINK has freed up internal resources to focus on operations, while other agencies can discover and self-serve data from their neighbours without delay. Accessing each state's operational data can enable a consistent national picture and allows agencies to maintain situational awareness and plan cohesive cross-border strategies. This also stops duplication of effort in mapping fire boundaries and avoids problems of timeliness and data quality. Mappers are able to access the most current and accurate data easily, even if it has been captured by another jurisdiction. Importantly, each feed is well described with metadata that explains the usage, currency and update frequency of the data, as well as the custodian and any access constraints.

During the bushfires of 2019–20, Geoscience Australia worked with states and territories to create a data aggregator that took feeds hosted in EM-LINK and compiled them into a national feed for bushfire boundaries. However, EM-LINK did not contain a feed for every jurisdiction. Some simply did not have the capability to host web services of their fire boundaries. A great deal of hasty and after-hours work was undertaken by Geoscience Australia and emergency management staff to serve data for the national feed. This work was manual, unsustainable and imposed on states already overwhelmed by bushfire response operations.

Access to EM-LINK

The national bushfire boundary feed was consumed by all levels of government. Requests for access increased markedly and EM-LINK was no longer only accessed by state and federal agencies, but was opened to non-government organisations, industry, researchers and the media. The appetite for the data has been voracious. During the 2019–20 fire season, there were 1.78 million feature requests. Interest has come from sectors that have not previously shown an interest in emergency response information.

Currently, there are about 140 emergency management-related web service profiles. There are also approximately 650 active subscribers from state and territory governments, industry, education and not-for-profit agencies. The national bushfire boundary feed was kept open for approximately 6 months after the major fires were extinguished to aid recovery agencies. However, due to the unsustainable nature of the product, in July 2020 the hosting via EMSINA's ESRI-sponsored ArcGIS online account ceased. The data and coding was handed over to the National Bushfire Recovery Agency as the Australian Government agency with the biggest interest in hosting a national feed into the future at the time. Geoscience Australia is currently responsible for delivering the national bushfire boundary feed and is working collaboratively with EMSINA and Australian Research Data Commons.

The future of EM-LINK

Even though data feed owners can log into EM-LINK directly to maintain the currency of their data feeds, this is a manual task and requires a human to audit feeds that are 'broken' or have been modified. Future iterations of EM-LINK will be hosted on a modern spatial platform and limit the need for manual updates by 'scraping' the metadata of each feed as it is hosted by the originating agency. The National Metadata working group is nearing completion of metadata standards and a tool accessed via the EMSINA website will allow agencies to create compliant metadata for their feeds. When the feed or the metadata changes in the authoritative agency source, EM-LINK will reflect these updates. There are challenges in bringing together national datasets to be used in Australian Government and state COPs and web mapping systems. These include differences in metadata, standards, attribution, accessibility and licensing across each jurisdiction. The 2019–20 bushfires highlighted some of these issues at state boundaries in how data was displayed and shared between states across different platforms.

Currently, EMSINA is working with EMA to identify and prioritise where funding may be targeted to allow all jurisdictions to provide near real-time feeds for the major incident types. EMSINA, Geoscience Australia and the Australian Research Data Commons are collaborating on a project to build an ongoing and sustainable national bushfire history capability. The first step in the roadmap is the national bushfire boundaries, both those active now and what has been affected by fire this season to date. A capability gap analysis was completed with state jurisdictions in 2020 and is being updated. Work packages are being built and prioritised for funding which aims to bring jurisdictional and Australian Government data sources to a consistent level. This would enable the creation of a national minimum viable product which can be continuously improved with further investment over time.

Endnote

1. EM-LINK is a catalogue of national emergency management spatial web services providing a comprehensive and current listing of authoritative emergency management related geospatial web services for a chosen hazard or region. It was built as a joint initiative between Emergency Management Australia, Geoscience Australia and the Emergency Management Spatial Information Network Australia.

