



# FIRE IN THE CLOUD

BRINGING TOGETHER EMERGENCY CALLS, PHOTOS AND ON-SITE REPORTS WITH GEOSPATIAL INFORMATION ABOUT BUILDINGS AND SAFETY ASSETS MAKES PREPARING FOR AND DEALING WITH EMERGENCIES MORE ACCURATE, MORE INTERACTIVE AND MORE EFFECTIVE. CHRIS HOLMES REPORTS ON A SYSTEM THAT BRINGS TOGETHER CLOUD COMPUTING AND AUGMENTED REALITY FOR EMERGENCY MANAGEMENT



ARE firechief shows first responders an AR view on their phone, highlighting assets like fire hydrants on screen



the scene is obscured by smoke – and it won't show you live information such as whether there's a traffic jam blocking the parking space reserved for the emergency services or a fire hydrant was reported faulty this morning.

A digital plan based on interactive maps, geotagged assets and real-time data is far more useful for planning how to react when things go wrong and for dealing with the situation when the worst happens.

### Augmented reality environment

That's what fire protection experts hhpberlin wanted to develop when it worked with Fichtner IT Consulting (FIT) to create ARE firechief as part of its Safetynext platform – ARE standing for 'augmented reality environment'. This combines an admin tool for geotagging assets and building a fire safety plan in advance with an interactive 3D map to guide rescue

related assets that are within 100m of a hydrant. Unstructured data used in the firechief software is stored in Azure Storage Blobs, including documents describing building details, images of buildings and assets and the icons used in map visualisations.

Azure Active Directory handles access, so visitors and travellers don't have to sign in, providing a view that shows them the evacuation route; emergency workers and admin staff log in to get different views showing the information they need. Only admin staff can add or edit assets and resources, and ExpressRoute keeps the connections (and the critical safety data) off the public internet.

Bing Maps was chosen for its worldwide coverage of high resolution maps, including venue maps and 3D maps for 400 cities globally, enterprise support and ease

## HOW CAN A CHINESE TOURIST IN BERLIN CALL THE FIRE DEPARTMENT? WE ADDED A CHINESE TO GERMAN TRANSLATION TO HELP

workers responding to an emergency and staff and visitors trying to escape.

As safety workers and first responders need access to information in a wide range of locations, Safetynext is a fully cloud-based platform that uses Bing Maps and Azure services. Bing Maps for Enterprise is used for mapping and geocoding, with geocoded assets stored in SQL Azure Database, Microsoft's cloud-based RDBMS, and Azure Storage. Structured data for assets is stored in SQL Azure, including geographical co-ordinates; the geospatial support in SQL Azure enables simple geo-queries, such as showing all the security-

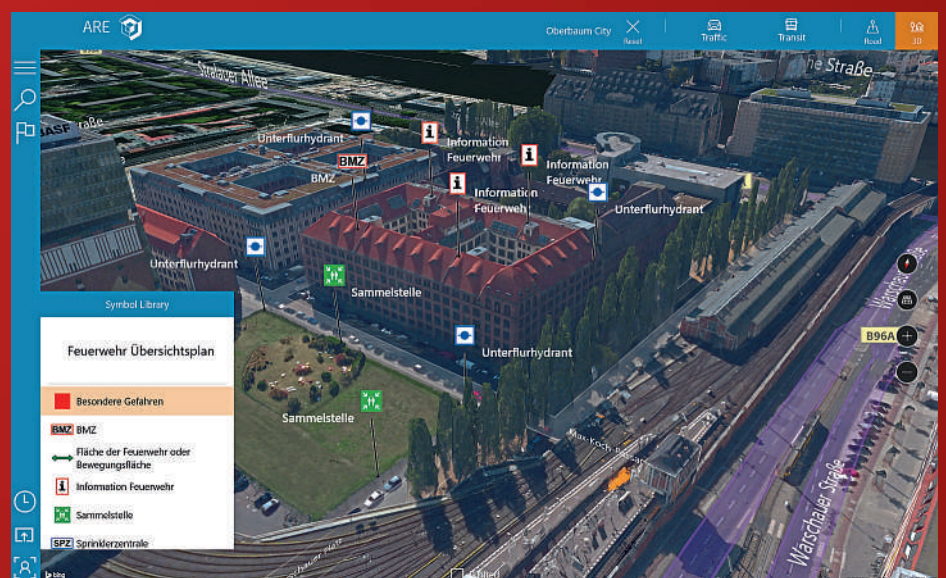
of development. FIT took advantage of Microsoft's Universal Windows Platform to build an app that works on phones and Windows tablets and uses augmented reality to show important assets. First responders going into a building can hold up their phones to see on-screen where the nearest fire hydrant is or which doors are safety exits.

The chief fire officer would see a more detailed map on their tablet, with 3D buildings and high resolution 30cm aerial imagery from Bing tagged to show the location of emergency assets and designated meeting points, with points of interest drawn from Bing Maps to help them identify nearby

Every large building needs a fire-safety plan – you've probably seen a small version displayed on the back of a hotel room door or on a wall in a train station or a shopping centre. The plan should include escape routes and meeting places, as well as details about safety doors, lifts, fire extinguishers, fire hydrants, and danger areas such as kitchens and flues. It also needs to tell staff what they need to do in the event of an evacuation.

As well as that small plan, there will be a full-scale plan on file in the building manager's office and maybe even a copy at the local fire brigade. However, neither version is as useful as it could be. Usually, these are paper plans that are hard to connect to what's happening on the ground or are too large and unwieldy to work with at an emergency site. It's also hard to tell if they're out of date.

A PDF of an emergency plan is better in that it lets you zoom in and out, but it still doesn't help you orient yourself, especially if



The detailed firechief interface shows 3D maps and assets to help the office in charge of the scene co-ordinate the response



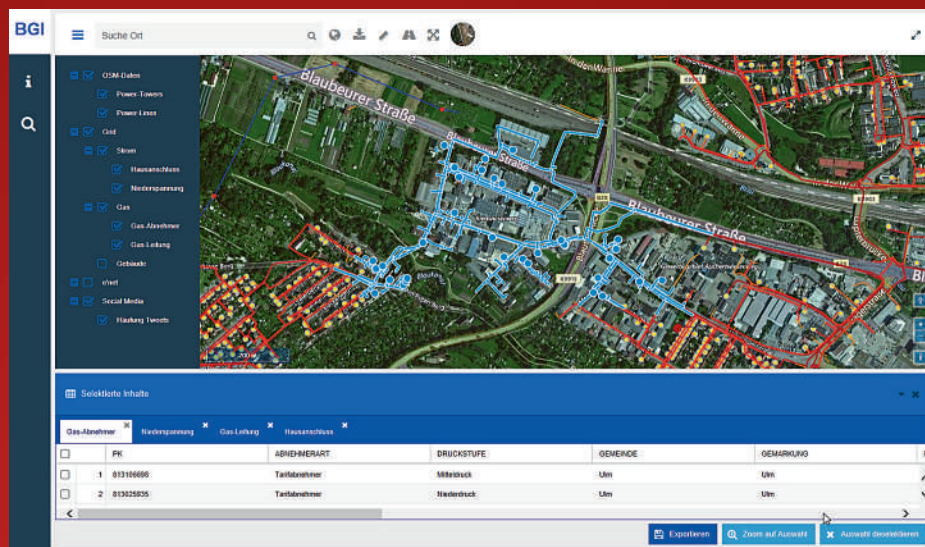
## EMERGENCY MANAGEMENT

infrastructure that could be at risk such as train lines. Floor plans and venue maps sourced by hhpberlin or the emergency service operators are shown as an overlay on top of the standard Bing Maps layers using a tiling service created by FIT.

"The chief fire officer can stand in front of the building and see assets behind the building," explains Peter Brack, director of Business Geo Intelligence at FIT. "They can use the map to see whether there's a footpath or a road, or a way to get to the fire hydrant behind the building. They can use the geocoding and location to see where they are and use the routing service to get a route to another building. They can see the current traffic in Bing Maps, with real-time traffic incidents and traffic flow, so they get a route that accounts for the current situation."

Network connectivity can be unreliable in emergencies, so the system uses Bing Maps' offline support to automatically switch to locally stored maps when necessary. Admin users get a different interface – an HTML5 responsive website built with the Bing Maps AJAX APIs, for entering and updating geocoded infrastructure assets such as fire hydrants and designated meeting points. They can also use the same maps and geocoded assets as the first responders for planning.

"You can analyse things such as



Combining utility information, routing and social media with the view of geocoded assets in the admin portal helps planning and live response

'How many fire hydrants with a volume of at least 5,000l per minute are within 100m of this shopping mall?' or 'How close can you park the fire engine to the entrance?'" Brack notes.

Safety information isn't static. Whether it's hiring more staff, reporting a faulty lift, completely renovating the office or putting on an event, the details of escape and rescue plans need to be kept up to date. Not all venues are permanent, either – for a football tournament or a beer festival, there

isn't a static plan as the tents, generators, toilet facilities and first aid areas will only be in place for a few days. That means it needs to be fast and easy to add new assets and get updates signed off by managers. The admin portal can also incorporate real-time information such as social media posts, where citizens might be sharing pictures that could help emergency responders understand the situation better.

Safetynext has a number of other modules for modelling fires (including a 3D smoke simulation), simulating pedestrian flow in an emergency and firebot, which could handle emergency calls and texts, collecting information to pass to the dispatcher. That could even include translating, Brack says. "How can a Chinese tourist in Berlin call the fire department? We added a Chinese to German translation to help."

### The future

What more could firechief do? How about a public version to help people evacuate? After all, if there's a fire alarm, you might look at the safety map on the back of the door before you leave your hotel room, but you're not going to pry it off and take it with you.

Interactive maps on your phone could get you safely out of the hazard area and to a meeting point where emergency responders are waiting to help. A digital map built into a hotel loyalty app or city guide or accessed using a QR code on the wall of a building could translate fire alarms to help overseas visitors who may not understand them and even guide you to the nearest train station, pharmacy or hospital.

The life-saving possibilities are endless.

**Chris Holmes is consulting technology writer for Grey Matter ([www.greymatter.com](http://www.greymatter.com)). With thanks to Peter Brack**



3D and augmented reality maps in a HoloLens or Windows Mixed Reality headset could overlay critical information on a building view