Environment Agency

"We drive the direction of continuous improvement; we create the roadmap. Fujitsu's role is to help us get there. It manages the risks and delivers our ambition. Fujitsu is the main reason we can deliver these projects so successfully."

Steve White
Product Manager, Flood Warning System
External Digital Services, Environment Agency

Customised phrasing transforms flood warnings

At a glance
Country: United Kingdom
Industry: Public sector
Founded: 1995
Website: gov.com

Challenge
The Environment Agency is responsible for identifying flood threats across England and communicating these risks to the public. With machine learning creating advances in text-to-speech services, it wanted to ensure its Flood Warning System was more accurate, more reliable, and more cost-effective.

Solution
Fujitsu worked with the Environment Agency to seamlessly integrate Amazon Polly with the Flood Warning System, to provide a highly resilient solution with sophisticated language support in both English and Welsh, and customised local dictionaries for regional place names.

Benefit
- Produces accurate pronunciation in English and Welsh, with eight regional accents
- Allows the EA to customise local phrases and place names
- Supports continuous service improvement, as the Amazon Polly neural network technology evolves and improves
- Reduces annual licensing costs from £40,000 to £1,000

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Customer

The Environment Agency (EA) is a non-departmental public body, established in 1995 and sponsored by the United Kingdom government's Department for Environment, Food and Rural Affairs (DEFRA). It is responsible for protecting and enhancing the environment in England, and works alongside Natural Resources Wales. Its remit covers the whole of England, about 13 million hectares of land, 22,000 miles of river and 3,100 miles of coastline.

Products and Services

- FUJITSU Flood Warning System
- FUJITSU Digital Transformation Center
- FUJITSU Enterprise Postgres

Delivering critical flood alerts

Climate crisis means we can expect more extreme weather events. In the UK, with its rainy weather, that often means floods.

"The weather is certainly getting stormier, and when you get extreme weather you get a greater risk of flooding," says Steve White, Product Manager, Flood Warning System, External Digital Services, Environment Agency.

The Environment Agency (EA) is responsible for identifying flood threats across England and communicating these risks to the public. At present 1.5 million households are on the agency's flood warning database, each receiving a message in the event of a local flood threat.

The Flood Warning System was created in 2006 and relaunched as a cloud-based service in March 2017, sending an average of 11,000 messages a day. In 2018, the EA converted over 122 million characters of text, producing over 2,000 hours of audio. While the relaunch proved effective, says White, the EA had identified areas of improvement.

"The quality of some of the calls was not what it should be. We spend a great deal of time and effort monitoring flood risks, in collecting data and modelling. It is not acceptable for the final message to the public to fail."

The issue, he explains, was that the previous solution was incapable of reflecting local pronunciation and accents, particularly with place names – vital detail when communicating specific threats to a local audience.

"It was clunky. We'd had constant feedback from users saying it wasn't good enough," White explains. "The old system was smart enough to allow us to update tricky words but was labour intensive to support."

Reliability, accuracy, diversity

Text-to-speech services are improving at a pace. White says he was aware of the impact of machine learning and neural networks, and the ability to create lifelike speech. The challenge for the EA was to find a solution that was reliable, cost effective and capable of coping with a diversity of regional dialects.

"Firstly, any solution would need to be extremely reliable. This is a critical service, we cannot tolerate downtime. We need the conversion to be near-instant, and we need it to cover Welsh language. Also, for consistency, we wanted a solution that could sync with our Interactive Voice Response (IVR) telephone service. Ideally, citizens should then hear a consistent voice across all channels."

Fujitsu worked with the EA to evaluate different options considering 27 different criteria including clarity of pronunciation, regional variations, and high reliability. The project is a product of a 15-year relationship with Fujitsu.

"After extensive testing with a variety of possible suppliers - converting thousands of sample clips from our existing flood warning system for user testing - we decided that Amazon Polly best met our requirements," says White.

Fujitsu then worked with the EA to seamlessly integrate Amazon Polly with the Flood Warning System to provide a highly resilient solution with sophisticated language support in both English and Welsh. The solution includes eight customised local dictionaries for regional place names.

"The engagement with Fujitsu is focused on helping us drive continuous development and deployment of new services," says White. "Because of the criticality of the systems, it's not always possible to work in a truly agile way, but I think we're moving as close to agile as we can."

Continuous improvement to protect the environment

The project, says White, has been transformative. Pronunciation is more accurate, and the system is constantly improving. White's team can intervene to customise local phrasing or place names; Amazon Polly then 'learns' from these changes.

"It just sounds better. The voice is more natural, which makes the message more credible," he says. "If any feedback or improvement ideas come in, we can manage them. We improve as we go along."

The solution helps reduce the impact of flooding by ensuring that 66% of households and businesses at high risk of flooding receive direct alerts.

The new approach is also a money saver. White says licensing costs associated with the previous text-to-speech came to £40,000 per year; the Amazon Polly solution is around £1,000. "We're funded by the taxpayer; we have to be considerate of cost," he says. "This is money we can spend elsewhere."

The solution has been designed to be modular, making it easier to add new services or functionality. The engagement with Amazon, and storing data in AWS, also reflects a broader shift by the UK public sector to adopt cloud solutions.

White expects the long-standing engagement with Fujitsu to continue to bear fruit: "We drive the direction of continuous improvement; we create the roadmap. Fujitsu's role is to help us get there. It manages the risks and delivers our ambition. Fujitsu is the main reason we can deliver these projects so successfully."

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