Success Story

REAL-TIME INTELLIGENT

TRAFFIC SYSTEMS WITH IRONMQ

Deploying an intelligent traffic system that instantly and automatically adjusts speed limits through the use of an active speed bump has been the goal for Edeva AB, a Swedish-based company. Edeva's product is a dynamic speed bump called Actibump. Actibump solves a worldwide problem – how to handle better manage traffic speeds, safety, accessibility, and flow in congested roads and highways. The technology does so in an intelligent and mindful manner, which is not possible with static speed bumps. Edeva uses IronMQ as a core piece within their infrastructure to collect and process real-time data and create a more intelligent traffic system. Edeva's combination of mechanical engineering and advanced data collection and processing demonstrates that the Internet of Things is real and within easy reach.

IronMQ has been very reliable and was easy to implement. We can take down the central server for maintenance and still rely on the data being gathered in IronMQ. When we start up the harvester again, we can consume the queue in parallel using IronWorker and be back to real-time quickly. We can also perform statistical data calculations via IronWorker without putting any additional loads on our main app servers.

John Eskilsson, Actibump Technical Architect

What is Actibump?

Actibump consists of several road modules that are mounted into a cast foundation with a radar unit that transmits information to a central control system. The road modules raise and lower in response to vehicle speed and are controlled and monitored over the Internet.

How the Actibump Works

The Actibump system collects and stores information continuously at each Actibump installation. It gathers data on each vehicle, including maximum speed, average speed, and vehicle type, giving operations teams the ability to unlock deeper intelligence into traffic management and traffic flow.

Actibump Capabilities

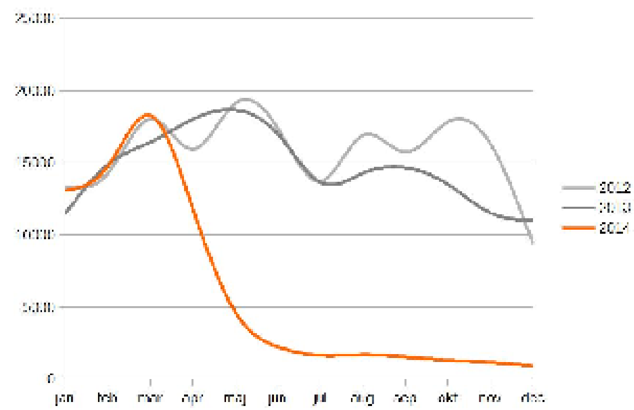
The system is able to dynamically adjust measurements and configuration, while continuously aggregating and displaying critical data within system dashboards. System capabilities will be expanded to include weather conditions, congestion levels, and other metrics to improve traffic flow and the safety of road user.

Reducing Speeds on the Øresund Bridge

In December 2013, Edeva won a public procurement for variable speed impediments to the Øresund Bridge. The bridge is a double-track railway and dual carriageway bridge-tunnel across the Øresund strait between Sweden and Denmark. The installation of the Øresund Bridge went online in the spring of 2014 and has already shown a dramatic impact in maintaining consistent speeds.

Before Iron.io

Prior to using IronMQ, Edeva did not have a good way of moving the gathered data from the processing modules connected to the speed bump. The original solution was based on recording the data within the units and then downloading the data in batches. The data was pulled by the central servers using FTP, reading up to a week's worth of data at a time. Attempts to collect the data from the local server on the site was slow and unreliable, making it hard to get accurate data from the speed bump. The delayed access also prevented timely use of the data.



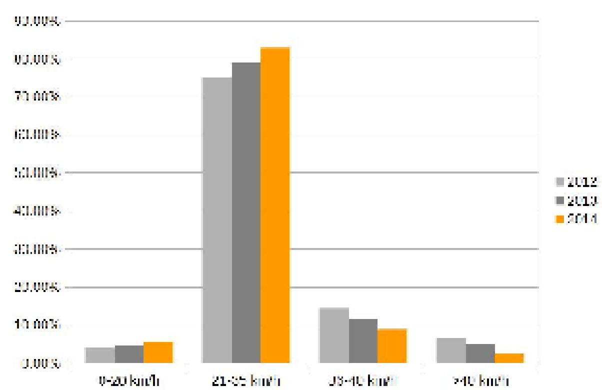
Reduction in Number of Speeding Cars

IronMQ and More Real-Time Processing

John Eskilsson, the technical architect of the Actibump system, made the decision to use IronMQ to speed up data collection between the Actibump modules and the MongoDB back-end datastore. Because it is cloud-based, has built-in access control, and uses HTTP/REST as the transport protocol, IronMQ was a snap to use within the processing units of the road modules.

Here's how the system works:

- An Actibump module gathers radar data via a C program and feeds it into a local datastore.
- The local processor polls the datastore every second and posts it to IronMQ.
- Within the central servers, there is a PHP harvester that polls IronMQ every second and adds the data to MongoDB.
- Once the data is in MongoDB, the web interface can be used to access the data in near real-time.



Increase in Consistency of Traffic Speeds

Net Results

Using this improved approach to collecting data, the elapsed time from when a car passes the speed bump until the data is in MongoDB has been reduced from weeks to just a few seconds. In just a short time in use on the Øresund Bridge, the Actibump system has significantly reduced the number of speeding cars while also maintaining speeds in a consistent and optimal range.

Future work includes using Iron.io's IronWorker service to do a statistical analysis on a continual basis within their central system. Additional sensors will also be added to the road modules. Because of their decision to use Iron.io, very little refactoring will be needed within the system given the flexible data schema and the use of a message queuing and async task processing to streamline, buffer, and process their event-driven data.

Actibump System Components