



## MySQL Enterprise Powers the Øresund Bridge – Processes Daily Traffic Data from 30,000 Vehicles



### Travel

OS: Microsoft, Red Hat, Linux

Database: MySQL Enterprise

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**Jacob Norengaard Keil**

Operations Manager Toll Systems,  
Øresund Bridge



### Øresund Bridge Overview

The Øresund sound is the strait that separates Denmark from Sweden. The total length of the bridge is 15.9 kilometers (52,493 feet), and about 30,000 vehicles cross the combined two-track rail and four-lane road bridge-tunnel on a daily basis. It is the longest combined road and rail bridge in Europe and connects the two metropolitan areas of the Øresund Region: the Danish capital of Copenhagen and the Swedish city of Malmö.

### The Business Challenge

The Øresund Bridge’s opening ceremony took place in July 2000. Initially, the Bridge’s databases were based on the MySQL Community Server. As the traffic increased, the need for a high quality monitoring tool and access to Sun’s production database support became crucial.

“Our main business challenge is to get our customers through the lanes as quickly as possible,” says Jacob Norengaard Keil, Operations Manager Toll Systems at Øresund Bridge. “The vehicles can drive at a speed of 30 km/hour and the databases need to process all traffic data without delay. Any disruption would cause time-wasting queues, and ultimately hurt our business.”

### The MySQL Solution

All vehicles pass through a toll booth by driving on one of the 11 lanes in each direction, 22 lanes in total. The performance of the 22 MySQL lane databases makes it possible to register vehicle type, user, price level, payment mode, currency, pictures and On Board Unit (OBU) of 600 cars per lane every hour.

In order to support and monitor the daily traffic data and transactions from 30,000 vehicles, the Øresund Bridge purchased a MySQL Enterprise™ Platinum subscription from Sun Microsystems.

The MySQL Enterprise Platinum subscription provides Øresund Bridge access to around-the-clock technical support delivered by Sun Microsystem’s MySQL experts. It also allows the Øresund Bridge to track and optimize application performance, availability and memory usage through Sun’s MySQL Enterprise Monitor, a “Virtual DBA” that monitors production database applications and minimizes security vulnerabilities, improves replication, and optimizes performance.

“The MySQL Enterprise Monitor is extremely powerful, and without a doubt indispensable for our business,” said Jacob Norengaard Keil. “With database tables containing up to 65 million rows, it is key that the reliability and the speed of the databases are outstanding. By supervising the databases through the MySQL Enterprise Monitor, I have the possibility to secure a continuous high performance with an extremely smart and easy-to-use monitoring tool.”

Moreover, both the Øresund Bridge's intranet and the Danish, Swedish, German and English websites are powered by MySQL in order to ensure high performance and secure administration of tickets purchase, discounts and other value added services offered to customers such as a "My Account" feature containing their personal information.

### Øresund Bridge IT infrastructure

Data such as the length, speed and OBU of 30,000 vehicles passing daily through the toll booths is collected by the Øresund Bridge's system integrator GEA LaneLogic. Thereafter, all data together with information concerning the user, type of vehicle, payment method etc. is transmitted to the LaneController, a Point of Sales system powered by MySQL Enterprise. At this point, the payment transactions, cash or credit card, are carried through. All credit card data, such as card number and expiring date, is secured by a 256-bit encryption. The MySQL solution ensures that all operations run smoothly both online and offline. Each MySQL database often contains up to 800 Gigabyte of data.

The LaneController in the respective toll booth subsequently sends the collected data to a central MySQL Enterprise powered lane server, collecting information from all 22 lane databases, which in turn transmits all information to the Øresund Bridge's ERP system.

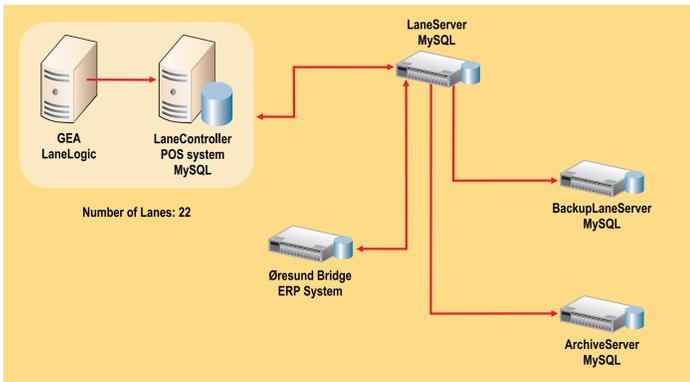
Backup and Archive functions are also ensured by the lane server which sends all data out to two servers, the Backup Lane Server and the Archive Server, both powered by MySQL Enterprise.

## The Future with MySQL

Every day 70,000 people commute between Denmark and Sweden by train or car via the Øresund Bridge, the equivalent of 25.7 million people a year. The Bridge has become a platform for new ideas: companies can expand their markets, people can work in the neighboring country, students can follow courses at more than one university and a day excursion with the family can just as easily go to "the other side."

It is expected that by 2015 the number of vehicles on the Øresund Bridge will increase by about 35% to approximately 40,000 a day.

"We will not let go of our MySQL databases and servers," Jacob Norengaard Keil concludes. "MySQL helps us manage our business challenges today, and will continue to do so in the future. By powering our mission critical IT infrastructure with MySQL Enterprise, our system can scale to handle a heavy traffic increase in the future."



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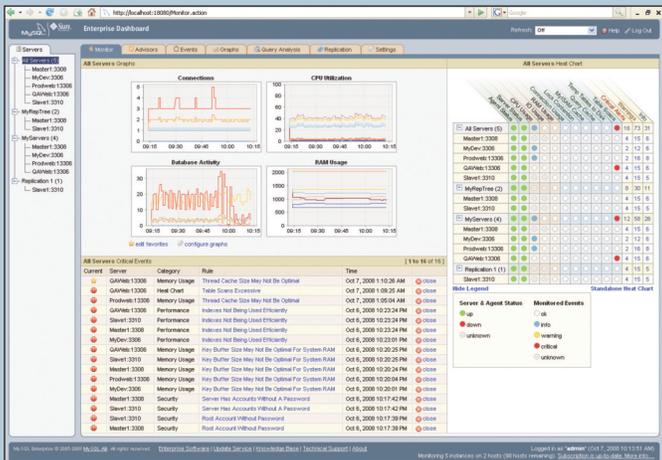
Operations Manager Toll Systems, Øresund Bridge



# MySQL Enterprise

## Full Support & Less Risk for Your Production Database Applications

A MySQL Enterprise subscription includes the most comprehensive set of MySQL database software, services and support so your business achieves the highest levels of reliability, security and uptime.



MySQL Enterprise includes:

- **MySQL Enterprise Server** – the most reliable, secure and up-to-date version of the world's most popular open source database
- **MySQL Enterprise Monitor** – GUI-based tools that continuously monitor your database and proactively advise you on how to implement MySQL best practices, including performance tips and security alerts
- **MySQL 24x7 Production Support** – with guaranteed response times to assist you in the development, deployment and management of your MySQL applications.

*Proactive database monitoring and advisory tools are available exclusively to MySQL Enterprise subscribers.*

## About MySQL

MySQL is the world's most popular open source database software. Many of the world's largest and fastest-growing organizations use MySQL to save time and money powering their high-volume Web sites, business-critical systems and packaged software – including industry leaders such as Yahoo!, Google, Alcatel-Lucent, YouTube and Zappos.com.

For more information about MySQL, please go to [www.mysql.com/enterprise](http://www.mysql.com/enterprise)

To contact MySQL online or via telephone, please go to [www.mysql.com/contact](http://www.mysql.com/contact)



The World's Most Popular Open Source Database