

City of Stockholm e-services

Executive summary

The City of Stockholm provides electronic services (e-services) to its nearly 1 million citizens, who use web and mobile applications for activities such as school registration, permit applications, and other city services. As support ended for some core components of the service-oriented architecture (SOA) platform, the city partnered with Volvo IT to migrate to Sentinet for BizTalk Server. Now, the city can better track software assets and metrics, and improve security, access control, and monitoring.

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Introduction 1

About Stockholm..... 1

The e-services project..... 2

The solution 2

Conclusion 5

 More information..... 6

Introduction

The City of Stockholm implemented electronic services (e-services) to make government accessible to nearly 1 million citizens. The e-services platform leverages service-oriented architecture (SOA) to deliver numerous reusable, critical APIs that serve as a backbone for the services. Citizens can access e-services via the web and mobile applications for activities such as registering for school, applying for permits, finding care for the elderly, and viewing invoices for city services. This paper explains how, as core components of the platform reached the end of their support life, the city migrated to Sentinet for BizTalk, a solution from Nevatech. Sentinet takes advantage of Microsoft platform technologies, including Microsoft BizTalk Server, SQL Server, Windows Server, and the Visual Studio development environment, to deliver required agility and extensibility. This solution has been in production for several years, and migrations to current versions of underlying software technologies enhance delivery of ever-increasing levels of service and performance.

About Stockholm

The City of Stockholm is the capital of Sweden and widely known as the home of the Nobel Prize. It has 40,000 employees and 900,000 residents. It is one of the five fastest-growing cities in Europe, projected to reach one million people by 2022. To accommodate this population growth, in addition to growth in targeted industries such as communications, information technology (IT), and life sciences research, the city has more than 100 construction projects in stages from planning to building. Stockholm is also strong in the finance industry, positioning itself as the finance center of northern Europe.

Stockholm provides a wide range of publicly financed social services, from free high-quality schools to care of the elderly; the city is committed to providing equal access to all of its citizens. The city is expanding transportation within the city through trams and underground transit lines, and is doubling rail capacity for the region, in addition to building new roads and expanding the port for freight and passenger traffic. Stockholm was the first city to receive the European Green Capital award from the European Union Commission in 2010, in part because of its goal to be fossil fuel-free by 2050. It is a highly connected city with the world's largest open fiber-optic network. As part of its Vision 2030 plan for a world-class capital city, Stockholm intends to become the natural choice for international sports and entertainment events, and one of the three most

popular event cities in Europe. Stockholm thinks of itself as the "capital of Scandinavia" and plans to become the hub for international trade in the Baltic Sea region.

The e-services project

The city has allocated 650 million SEK (90 million USD) to use IT to make the city's services simple and accessible to everyone. The city government offers electronic services (e-services) to citizens, companies, interest groups, and other agencies. Some examples of e-services include registering children in preschool and school, applying for and paying for permits and licenses, coordinating care for the elderly, and booking the use of city facilities.

The project is based on service-oriented architecture (SOA) to deliver reusable and critical APIs that serve as a backbone for e-services and mobile applications. The city's SOA requirements stipulate that e-services and mobile applications be provided with design-time governance and run-time operational management via a lightweight and efficient services virtualization platform.

The city partnered with two service providers, Volvo IT and Nevatech, to support a portion of the services offered. Volvo IT, with a focus on sustainable IT, developed the e-services platform and maintains it together with the City of Stockholm. Microsoft Gold Certified Partner Nevatech's premier product, Sentinet, is a key piece of software that offers SOA governance and API management for the platform.

The solution

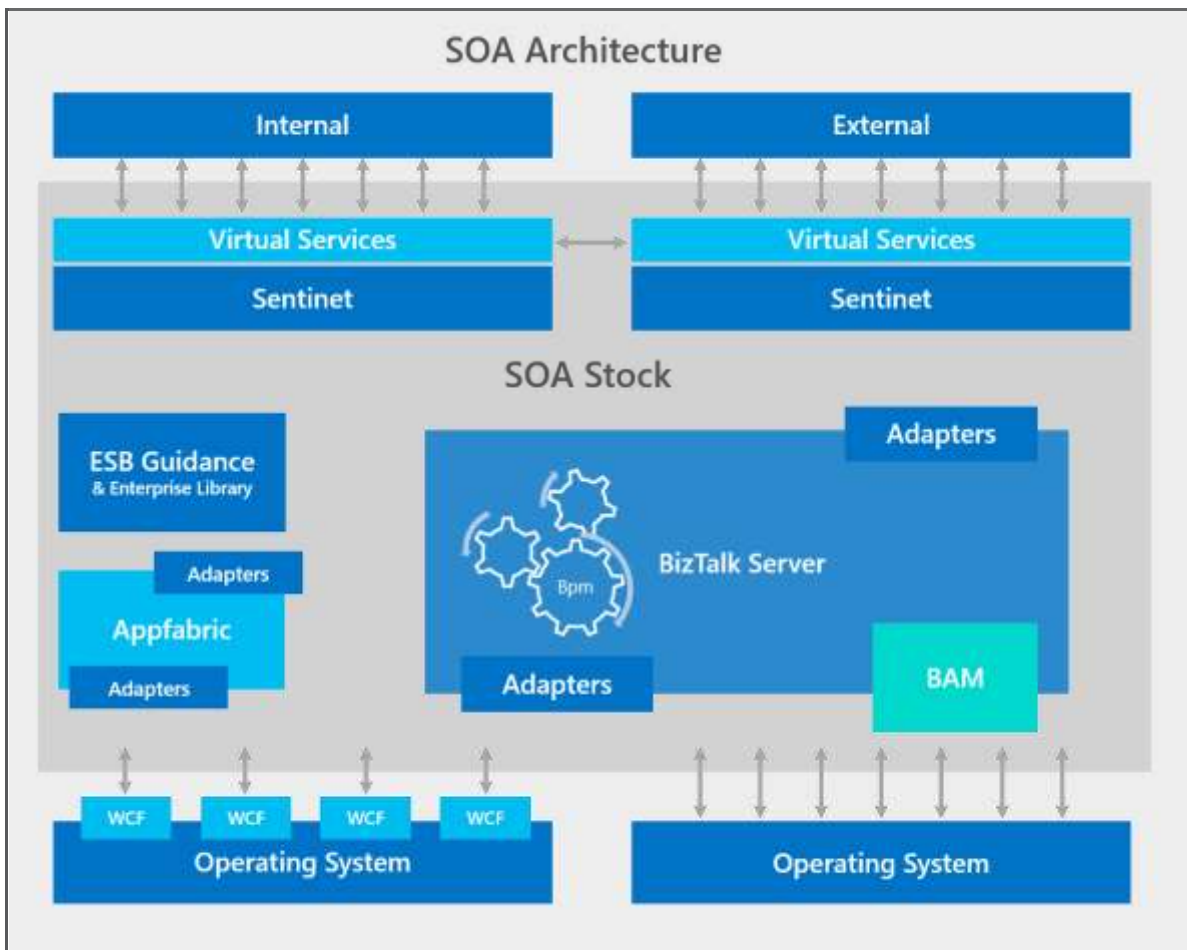
Initially, Volvo IT and the City of Stockholm implemented BizTalk Server with Microsoft Managed Services Engine (MSE), an open-source project from Microsoft Consulting Services that registers, maintains, and manages a portion of the e-services, and the CA Technologies security gateway. As MSE and the gateway reached end-of-life, Volvo IT—in close collaboration with Microsoft Consulting Services in Sweden—recommended the City of Stockholm replace MSE and the CA Technologies gateway with Nevatech Sentinet. The current e-services solution uses BizTalk Server and Sentinet to support a growing number of the 400 to 500 e-services currently offered by the city.

Solution architecture

In the architecture of the city's e-services, the virtual services are a layer on top of Sentinet. BizTalk Server uses multiple adapters to connect different types of services and Business Activity Monitoring (BAM) to provide a framework for tracking specific business processes. Microsoft Enterprise Service Bus (ESB) Toolkit works with BizTalk Server to support a loosely coupled messaging architecture and provides the basis for several

common services, including message routing, message validation, and message transformation. AppFabric allows users to develop simple integration applications. The following figure illustrates the architecture.

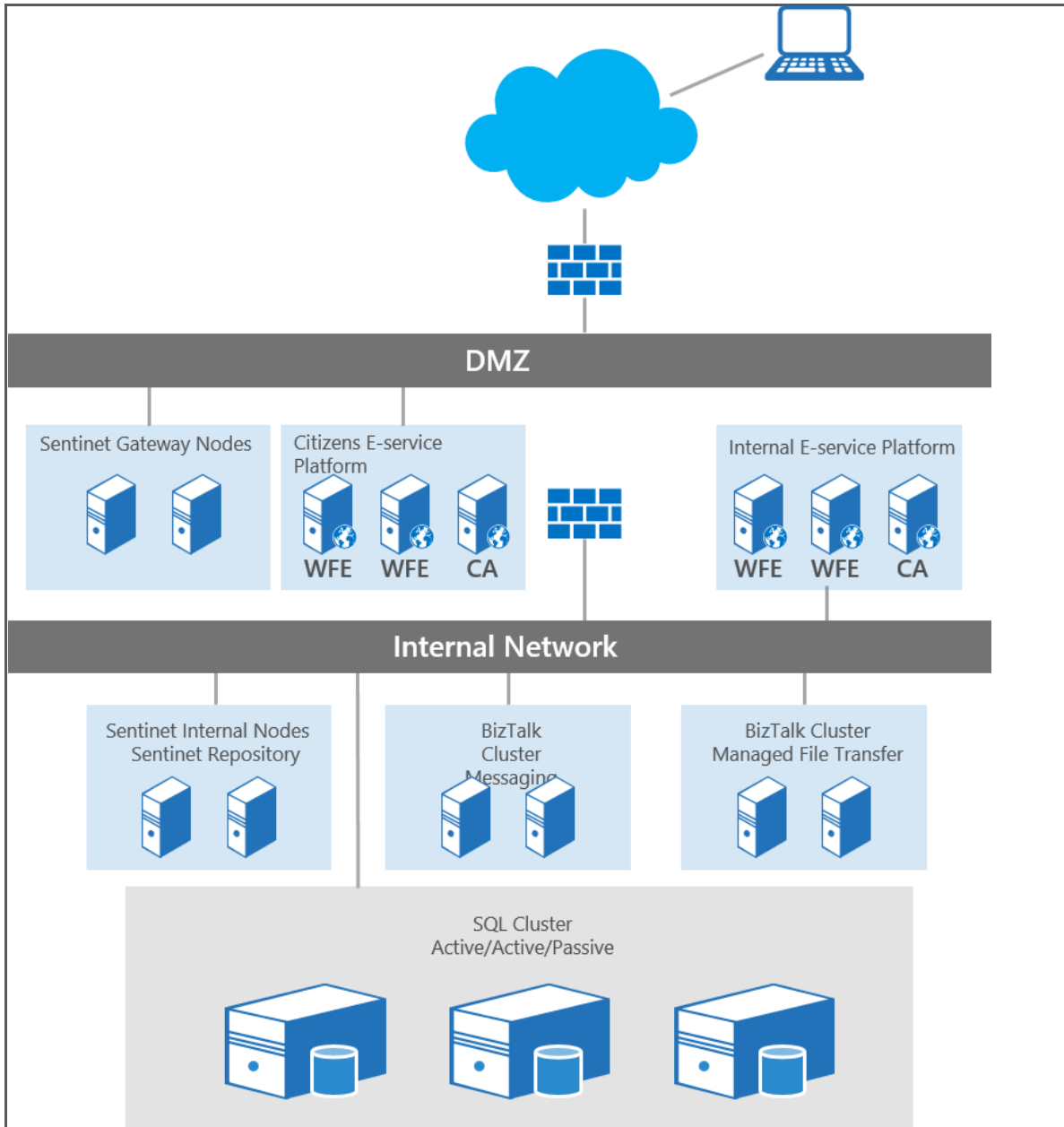
Service Oriented Architecture for the City of Stockholm



Details

The perimeter network (also known as DMZ, demilitarized zone, and screened subnet) is a subnetwork that contains and exposes the city's external-facing services to the Internet. The Sentinet gateway nodes and the citizens' e-service platform connect to the perimeter network, which in turn is connected through a firewall to the internal network. The Sentinet internal nodes, Sentinet repository, BizTalk group for messaging, BizTalk group for managed file transfer, and SQL cluster are connected to the internal network.

BizTalk handles file transfers, web services, and routing to allow citizens to apply for parking permits, view invoices, pay bills (using Oracle Adapters), and other functions.



Scope and resources

In addition to Sentinet, the platform includes Windows Communication Foundation (WCF) hosting, digital signing services, and other elements managed by a team of eight people. Two people are dedicated to deployments, including virtualization of services.

Up to 500 services are currently offered to the 900,000 residents of Stockholm, with 25 to 30 services being hosted by BizTalk.

Two BizTalk groups exist in the City of Stockholm's e-services solution:

- **Messaging** includes maps and orchestrations, and currently handles 23 different integrations and approximately 6,000 messages per day.
- **File Integrations** handles 29 different integrations and approximately 1,600 files per day.

In addition to connecting different systems through web services, BizTalk Server also manages connections through a variety of protocols by using adapters. These two BizTalk groups use the WCF SQL, Oracle LOB, File, FTP, SFTP, and WCF adapters. For example, parking services, payment systems, and viewing city invoices use these adapters.

Sentinet handles a variety of back-end services, including WCF and BizTalk, and processes approximately 600,000 messages per day.

Timeline

Volvo IT began handling client/server solutions and hosting BizTalk in 2009; and began handling the city's e-services in April 2010. Two architects worked on the e-services transition and moved the defined solution to another hosting environment. They implemented a solution using BizTalk Server 2006, Microsoft Managed Services Engine (MSE), and the CA Technologies SOA gateway.

In 2011, Volvo IT upgraded the system to BizTalk Server 2010. At the same time, both MSE and the CA gateway had reached end-of-life. So Volvo implemented Nevatech Sentinet to handle service virtualization and governance. This simplified the architecture by allowing the use of one virtualization platform instead of two and took just two months to complete. A few applications were not compatible, because BizTalk Server 2006 was built on .NET Framework 1.1 and BizTalk Server 2010 was built on .NET Framework 4. But overall, "the migration went very smoothly," says Björn Palmqvist of Volvo IT.

What's next

In autumn of 2014, the e-services platform will be upgraded to current versions of the Microsoft integration platform, including BizTalk 2013 to support Representational State Transfer (REST) adapters, which are needed to grow the mobile platform. The Microsoft integration platform on-premises includes BizTalk Server, SQL Server, Windows Server with System Center, and development capabilities from Visual Studio. New functionality in these technologies can deliver and enable powerful solution enhancements.

Conclusion

A robust and upgradable platform has allowed the City of Stockholm to provide 300 e-services and mobile applications to most of its 900,000 residents. Through the web and mobile apps, the people of Stockholm can access parking services, payment systems, and view city invoices, in addition to many more e-services. New functionality in the Microsoft integration platform - including BizTalk Server, SQL Server, Windows Server with System Center, and development capabilities from Visual Studio - deliver and enable powerful solution enhancements. The city expects to be able to continue to provide these services through the significant population and infrastructure growth that it has forecast.

More information

For more information about the City of Stockholm, visit the website at <http://www.stockholm.se/>

For more information about Volvo IT, visit the website at www.volvoit.com

For more information about Nevatech, visit the website at www.nevatech.com

Learn more about Microsoft Integration Solutions:: <http://azure.microsoft.com/en-us/solutions/integration/>

BizTalk Server homepage on Microsoft.com: <http://microsoft.com/BizTalk>

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