Integrating Enterprise GIS with Cloud Computing for Transportation Planning and Modeling

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Abstract—Today's enterprise information systems (EIS) are rapidly evolving both in terms of architecture and content. The various modern operating systems, applications, and databases that form today’s EIS are made more usable and scalable by integration into the cloud, while also becoming more complicated. There is a critical need for organizations that house big data, such as the Durham Chapel Hill Carrboro Metropolitan Planning Organization (DCHC MPO), to leverage cloud computing as part of their EIS strategy to serve geospatial data and applications to external stakeholders. Integration with the cloud enables the use of online applications that are flexible, distributed, and scalable to achieve greater operational efficiency, backup/archival capabilities, and other benefits. The key to success in integration is the ability to deploy distributed cloud-based enterprise service bus (ESB) and service oriented architecture (SOA) processes to integrate value chains in a continually changing environment.

DCHC MPO has developed two applications that integrate enterprise GIS with cloud computing using Esri products. The first application is a regional travel demand model (Triangle Regional Model) which facilitates information sharing between state, regional, and municipal transportation modelers who find it easier to collaborate over the web rather than by email, FTP, or other means. The second application is a regional land use model (CommunityViz) in which planners from several dozen stakeholder agencies edit parcel attribute data using a selection of client tools. This paper will identify the foundational architecture required to enable the seamless integration of an enterprise system with a public cloud to achieve better collaboration and more streamlined organizational processes. It will also discuss the pros and cons of public cloud and integrated cloud architectures.

Keywords – ArcGIS Server, Cloud Services, Enterprise Information Systems, Cloud Integration

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Behind the Scenes Enterprise Database Setup

Features classic within geodatabase can be enabled to track the history of data, and features can be migrated to individual databases.

Administrators can create named versions of the database. Data made in an "old" version can be removed and reapplied back into "new" versions, where those changes can be checked in before being moved back to the base database. (Interactive version)

Editors can use a set of protective queries to track accidental changes and integrate them back into the workflow.

The editing modules help to maintain access to historical versions of the data and ensure the propagation of the edits while keeping the records of past changes.

Abstract

The DCHC ARQ has used enterprise information systems (GIS) to integrate geographic data with cloud-based mapping and analytic applications. The integration allows the ability to efficiently access the data, distribute it among our partners, and collaborate on analysis, and management of the data on the cloud. Collaborative data sharing and data management proceeding. The DCHC ARQ also provides data access, and data sharing services at the foundation of the system can be configured to allow complex capabilities like data viewing, versioned editing, versioning, and archiving.

Service Setup and Cloud Integration

Once back-end setup is completed, the data can be published as a service. The service contains underlying and other important data that is published. A feature service can allow the geospatial and its attributes to be edited by users with permission. Security is set up in the service manager and server roles and granular access privilege.

The published service is added to ArcGIS Online. A cloud-based mapping platform from Map, where the final application can be configured, published, and shared.

Editing in the Cloud

Access and other ready available applications are great for users who are not familiar with access for desktop data. Cloud-based applications with access to ArcGIS Online and ArcGIS Pro allow the user to make changes to and layer data. Users can make concurrent changes to the interface, such as changing symbology, using queries to filter the features, and sharing the knowledge.

Conclusion

The integration of our enterprise (GIS) with the cloud has allowed our organization to effectively collaborate on geospatial projects. The underlying database and server architecture provide flexible capability for the DCHC ARQ to integrate, analyze, and share data. The cloud platform provides flexibility, usable applications to increase the efficiency and effectiveness of transportation planning and modeling processes.

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