

# San Francisco's Enterprise GIS: Forward Thinking and Politically Correct

By [Joe Francica](#)

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The City and County of San Francisco's Department of Telecommunications and Information Services (DTIS) provides the technology infrastructure for a majority of San Francisco's 60-plus departments. Many of these departments use geospatial information to plan and coordinate their daily business processes such as real property analysis and emergency services. Working with ESRI and IBM, DTIS chose IBM DB2 Universal Database with IBM DB2 Spatial Extender to create an enterprise geographic information system--a repository of

geospatial data, shared citywide. The system has improved San Francisco's ability to manage and facilitate business processes and enhance coordination of public safety services such as disaster planning and homeland security. Editor-in-Chief, Joe Francica, interviewed Erich Seamon GIS Manager of DTIS to find out how the city's enterprise GIS was built, both technically and politically.

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**Joe Francica (JF):** How many internal departments do you support, and how many other departments want to have for more access to spatial data?

**Erich Seamon (ES):** About 3 years ago, DTIS took on this effort of being the city's enterprise GIS department. Previously the base map was developed under Public Works, and Public Works were the



ones that worked with other departments to get them static copies of information. So, over the past few years, we've really automated all of that, where departments can log on and dynamically access data and conversely update their information in central repositories, if they want to. So, over the past 3 years, we have about half the departments, roughly 30, that are actively engaged with us, fiscally, or are using data on a daily basis. The other half are made up of smaller departments that have not used GIS very much or used GIS sporadically and have been focusing on their own needs. But, the majority of the really big departments have been working like the Department of Public Works (DPW) and PUC (Public Utilities Commission), Recreation and Parks, and the Mayor's office. The big departments are working with us. We're anticipating that over the next couple years that everybody will be on board with us. Everybody will be logging in and updating their data and utilizing the output of that. And actually, we have a lot of departments that although they may not be actively engaged in updating information in our database, they are use our web components. They are using our web services to get information about other departments.

**(JF):** So some of those departments are the originators of the data, and some are users?

That is correct. We have a lot of users. The funding model is such and I'll try to simplify it: DTIS is a work order department. We are very much like technology consultants. We have billable rates and we provide our services on a cost basis. We are not "jungle-funded."

Enterprise GIS is funded through a sponsorship that is paid every year. It is like an annual fee. Each department pays for it and what they get for it is dynamic access to our databases; they can directly have ArcCatalog with their ArcGIS or ArcView applications and look at data directly. But everybody in the city, regardless of whether you are a sponsor or not, can access to our internal map applications. So, we have a lot of users who don't pay that sponsorship but still access those map applications and derive the value of all this data. And that's probably every city department.



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**(JF): So, before 3 years ago, what was the situation for managing spatial data for the city?**

Very manual. DPW updated base map information and that was really only 5 or 6 core layers: Parcels, street centerline, edge of pavement, those kinds of pieces of information. They were updating that information and they would provide it to departments by CD on a quarterly basis.

And then the department would take that data and once the CD was given to them they would do whatever they want; use it; don't use it. But, we've given it to you; now you're on your own. And so our approach has been over the past 3 year, "let's change that," we don't it to be a static CD given to people. We want people to access this dynamically. We want to be able to give them to tools to use the information. So our key approach has been to use map services; using a web browser interface to facilitate people being able to use this information...as opposed to just saying: "Here's a CD, but we're not going to give you anything to use it with." We're saying, "you can download the data, you can dynamically access the database, or you can go to the web browsers to look at it, and that may suffice. And for us, that usually works for 90% of the people.

**(JF): Was the data originally in a digital form? Was it in AutoCAD?**

Yes, since 1993, there have been processes going on to take our information from paper form to electronic. The problem wasn't the core base map data. Our base map data and how it was structured was pretty sound. It was the mechanism on how it was distributed and the application that could be used to access that data. So, we had a pretty strong foundation in terms of digital base map information.

**(JF): Is any of it still in AutoCAD format or is it all in DB2?**

We still have some in AutoCAD format and, we actually we still run through a process with several departments who update their information in AutoCAD and then we actually use ESRI's CAD client to update just the changes from those AutoCAD files into a geodatabase. So, we have a process set up that allows those users who are using AutoCAD to update core information to update that information directly into a geodatabase. So, the answer is, yes, we still have AutoCAD users, but the majority of our folks who are doing GIS analysis, as opposed to more construction design engineering, are using ESRI tools.

**(JF): ArcGIS?**

ArcGIS, ArcView, ArcIMS. A combination of those tools?

But distributed across the city, the majority of the users are going to use ArcIMS?

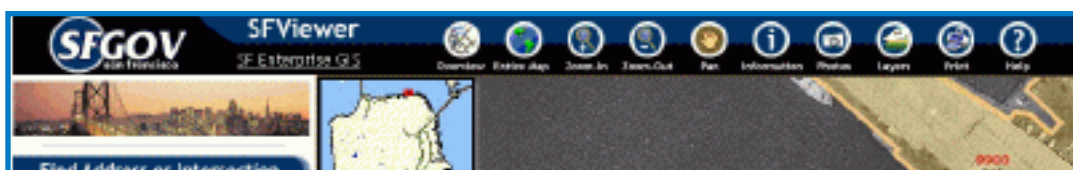
The majority of users are ArcIMS. Although we probably have 200 - 300 users who are using heavy client tools are using ArcGIS, or ArcView; something else to actually log into our SDE databases and view our local data into their client application. In terms of the total number of city users, we definitely have many more people hitting our ArcIMS services.

**(JF): As far as tuning DB2, do you find it scalable with respect to the number users hitting the database?**

Actually, one of the things that has been very good for us is the performance of DB2 in terms of the number of people hitting it and how it performs. Once we got our experience level up to speed on it, we found that the response time in bringing back data, bringing back spatial queries, has been very good. So, we've been very happy with that. The one thing I would say is that our shop supports all flavors of databases. We have Oracle DBAs (database administrators), we have DB2 DBAs; we have SQL Server folks. And the support in tuning DB2 is different for DB2 than for Oracle or SQL Server. So there was a learning curve that we did have to get up to speed on that. So, when we did that, we were able to tune DB2 to the performance level that we needed it.

**(JF): And what was the reason for going to DB2 Spatial and not Oracle Spatial?**

Well, when we initially sat down at the beginning and did a requirements analysis, one of the key components for us is that we were using ESRI tools. We had settled on ArcIMS and the ArcGIS model for structuring our data and displaying our maps our via a web map service. And when we looked at databases, we felt that DB2 had more of the ESRI components directly embedded into the database. And that was a real key issue for us. If we already hitched our wagon to using ESRI tools across the enterprise, we wanted to make sure that the integration between the database and those applications are going to be seamless; and there is not going to be any conflicts there.



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Although we use Oracle extensively, and we are actually contemplating using Oracle Spatial in some other areas, we felt that there was maybe some conflicts between the technology that Oracle was embedding in Oracle Spatial and that they could potentially be conflicts with ESRI software. Now, I know, I am sure that Oracle would debate that

tremendously and say

that's not the case, but when we went through our requirements analysis we just felt that one of the pieces that IBM saying, "we're not in the GIS business; we're not interested in going into the spatial area; we're going to leverage what ESRI has. We thought that piece was very valuable for us in terms of overall success. We just wanted it to work.

We've been looking at Oracle Spatial over the last few months, and it doesn't preclude us from using it in those other areas. But in this instance of our enterprise GIS we felt that DB2 was the best.

**(JF): It seems like Oracle has made Oracle Spatial more robust with the additional functionality that is in Oracle 10g.**

Yes, I would agree with you. One of the advantages, if we were to look at Oracle Spatial, would be that we can do direct updates from Autodesk software directly into Oracle Spatial as opposed to having to try to go through ArcSDE. There is a value to that. The other mechanism is difficult to do. So, there is some value for Oracle Spatial as well.

**(JF): It is unusual for me to hear, not just a city, but for any entity to take a step back and evaluate their need for an "enterprise GIS" to capitalize on their spatial information. Was that a technical decision or a political decision within the city government to save money?**

I think the answer to your question is that there were some political aspects involved here. There were some financial aspects involved. I think that one of the key motivators, however, was that the city departments had a need and that that need had not been fulfilled over the past 5 or 6 years. DPW had been building a base map and had been building a mechanism to distribute it but that departments were using it sporadically. They had a sense that GIS could be used to save themselves a tremendous amount of money, but they really didn't have an understanding of the technology and they didn't feel like they were getting the support to do it. But they also recognized that it probably wouldn't be beneficial for each of them to build their

own and build their own applications because there's a lot of integrated businesses processes that go on between departments. So, luckily we caught the situation before it started to proliferate.

[Each department] recognized that this type of program should be in technology; it shouldn't be in public works and that DTIS should be the leading agency to implement this. And the mayor recognized this and came out and came out with a statement saying that he was making DTIS the department to implement our enterprise GIS. So, we had some political backing on that.

There was recognition at the departments that there was a need. So, DTIS said that given what the mayor said and given what the departments are saying, we will put some money up front to get this going. So, we put in some common servers and started to coalesce this data based on the strategic plan that we put in place that basically said if we put enterprise GIS in place, how would it work. So, I think we were lucky. The departments had a need; we said we could fulfill this need, and we're not asking for all these millions of dollars. We think we can do it. And we were tactical in that we provided some solutions and successes, and that has helped to "snowball" the effort. And now I think departments are on our side. The opportunity was there.

**(JF): It is very forward thinking; not like what I have heard from other city departments that are implementing GIS.**

We didn't slam it down people's throats. San Francisco is a very politically active city. There is a lot of politics going on between city departments. People were jockeying for money. And we didn't want to be sucked down into that.

Departments had a need. We wanted to put something in place that works. Let's show some success that will give momentum. There's success here, let's build on that.

**(JF): Erich, thanks so much for your time.**

**[The public website for the City & County of San Francisco can be viewed [HERE.](#)]**