Telecom Connections

ESRI • Winter 2007

GIS for Telecommunications

In This Issue

SoftBank Group Creates Broadband and Mobile Synergies for New Services

By Kazuhisa Shibayama, Softbank BB general manager, Area Information Planning Department

Competition in Japanese telecom markets is dynamically accelerating, propelled by a series of new developments—broadband service growth to more than 24 million customers, the introduction of telephone number portability to the mobile phone market in October 2006, and new companies entering the mobile telecom industry.

In the face of one of the world's largest and toughest markets—the industry has $138 billion in total annual sales—SoftBank Group is developing an integrated marketing strategy for supporting its business expansion. One goal is to provide a smooth transition as it moves existing ADSL to fiber network service. SoftBank already has a top share in Japan's ADSL service and seeks to expand Yahoo! Broadband (Yahoo! BB), its fiber network service, to meet growing customer demand for widespread broadband connectivity; digital media and other rich service content; and new, innovative Web-based services.

In April 2006, SoftBank purchased Vodafone K.K., a Japanese mobile carrier, for $15.4 billion. Renamed SoftBank Mobile Corp., the former Vodafone business unit is expected to develop new and cutting-edge mobile phone services.

A technician reviews the analysis results.

Today's telecom companies are planning next-generation services that will serve a global culture in which people can communicate with anyone, anywhere and anytime. One of the most significant tasks to accomplish in implementing this vision is the construction of a new backbone network infrastructure and a system platform that will allow combined broadband and mobile phone service management.

This integration of existing and new services with an efficient management system is especially relevant for SoftBank since it owns both mobile and broadband services. SoftBank Group realizes that integrated management tools help reduce overlapping and redundant operations and investments and support the ability to continue offering attractive customer pricing and high-quality service.

While investigating potential integration solutions, SoftBank BB's Technology Headquarters Equipment Engineering Division personnel found that the use of geographic information system (GIS) technology makes it possible to overlay facilities, capacities, and other information using geographic location as a common factor. The resulting system pro-

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User Conference Explores the Future of GIS

Telecommunications Track and Awards Cover Lots of Ground

Geography and GIS: Communicating Our World was the message ESRI founder and president Jack Dangermond gave in the opening plenary to last summer's 2006 ESRI International User Conference in San Diego, California. "Our world needs better understanding, and GIS is the medium that helps us communicate and understand our world."

Dangermond used the plenary to show the many ways that ESRI's software development strategy supports a shared environment with the goal of making GIS easily accessible for everybody. "I see a GIS wherein users can get data, drag and drop data, and serve data," he said.

During the plenary, ESRI staff showed new features in ArcGIS 9.2 and new animation tools to create, play back, and export animations and animated graphics. They also demonstrated geodatabase archiving that allows users to record and display changes over time.

The ArcGIS Explorer presentation showed how the lightweight desktop client can be used to access, integrate, and utilize GIS services, geographic content, and other Web services to create a single, customizable view. Dangermond used the word *GeoWeb* to describe geoinformation content on the Web and *geoservices* to describe ArcGIS services and other interfaces that give online access to geospatial capabilities. ArcGIS Server provides spatial data management, visualization, and spatial analysis tools via the Web, thus promoting collaboration among owners of disparate datasets.

Dangermond concluded, "This type of collaboration will change the world. It can be applied to businesses to improve profitability, used to mitigate conflict, and applied for decision making to make the world more sustainable."

Alan Gould (left), TELCO GIS specialist for Openreach, a BT Group business, accepts the Special Achievement in GIS award from Jack Dangermond, ESRI president, on behalf of the BT Group.

Keynote speaker Bob Kerrey, president of The New School in New York City, spoke on the potential benefits that GIS technology may deliver in the areas of security, government planning, intergovernmental decision making, health and safety regulation, and education. Kerrey was a major force in forming the Parsons Institute for Information Mapping, dedicated to building visualization tools for improved analysis of complex information.

Dangermond presented a Lifetime Achievement award to Dr. Larry Smarr, director of the California Institute for Telecommunications and Information Technology at the University of California, San Diego. Smarr is a pioneer in prototyping a national information infrastructure to support academic research, governmental functions, and industrial competitiveness, and he played a pivotal role in the development of the Internet and high-performance computing. Smarr talked about where information technology is going in the future and described how optical networking and high-definition video will be the way forward for presenting large images related to research, science, and technology.

Of the more than 160 national and international organizations receiving Special Achievement in GIS (SAG) awards, three were in the telecommunications and location-based services (LBS) industry fields. British Telecom (BT) was recognized for application of GIS technology in providing comprehensive network planning, designing, and maintenance services in the United Kingdom. Its solution manages one of the world's largest copper access and fiber core networks.

ESRI International User Conference Set for June 2007

The Twenty-seventh Annual ESRI International User Conference (UC) will take place June 18–22, 2007, at the San Diego Convention Center in San Diego, California. This gathering is for those who use ESRI's GIS solutions to manage and share geospatial data and analysis capabilities on the desktop, across the enterprise, in mobile devices, and through Web-based services. A comprehensive offering of sessions, workshops, and exhibits will help both experienced and novice users of GIS expand their knowledge and further their skills for deploying geospatial data and workflows at all levels of government, in business operations, and in society.

A Telecommunications track during the conference will explore the use of GIS in designing and managing communications networks including marketing and sales, network planning, customer relationship management, and workforce management.

The 2007 conference will feature a one-day Plenary Session covering highlights in development work by ArcGIS product teams. The conference week will include technical workshops and user presentation. Workshops will cover ArcGIS software and extensions in detail, benefiting GIS users and development teams. User presentations, organized by topic and industry tracks, will enable users to discuss their applications and share lessons learned with others who share their goals and objectives for GIS.

New for 2007 will be the Benefits of GIS track, designed for managers and senior executives to discuss the value and achievements of GIS technology within government and utilities as well as private sector organizations. The 2007 ESRI UC will feature a comprehensive exhibits area, offering direct access to hundreds of ESRI business partners and information on the products and services that are available to support GIS users.

GIS users of all skill levels will benefit from attending the 2007 ESRI International User Conference and concurrent events. The online registration deadline is April 27, 2007. Other dates, deadlines, and conference details are now available at www.esri.com/uc.

When BT wanted to provide its engineering groups with the ability to maintain inside and outside plant facilities in one application, it chose Telcordia's Network Engineer, which is based on ArcGIS. With an end-to-end view of inside and outside plant facilities, personnel can generate detailed service requirements that help maximize capacity, reduce costs, improve performance, and speed service introductions. The engineering groups needed a graphic environment that would display the model against detailed land base features and customer information. Combining a geospatial network management system with a unified data model and accurate network inventory provided the crucial elements for achieving operational excellence. BT's GIS-based system will serve as the foundation for planning, design, and building while the integration capabilities support provisioning and operation of the complex, distributed communications network. BT chose GIS technology because it streamlines operations while providing improved ease of use and delivering a faster time to market of new services.

SAG award winner LOC-AID, based in Boca Raton, Florida, has developed a suite of LBS solutions that include friend finder, social networking, gaming, and workforce management. One application, LOC-AID Treasure, offers a different method for wireless carriers to introduce LBS services to consumers and enterprise customers. It takes players on a location-based treasure hunt. Players can share the fun with others and win prizes while learning to use their wireless devices to navigate maps and access images. LOC-AID is currently introducing a new generation to the benefits of using mobile GIS technology.

Qatar Telecom, the telecommunications provider in the State of Qatar, received a SAG award for improving customer service through using ArcGIS Schematics. The resulting ability to derive schematic products directly from the geodatabase makes for more timely system updates and increased accuracy.

More than 13,000 GIS users attended and more than 1,000 papers were given during the four-day conference. The Telecommunications and Location-Based Services track included presentations on using GIS technology for business intelligence, network management, microwave coverage analysis, and cost analysis for broadband deployment.

Congratulations to all SAG award winners for their exceptional work. To learn more, visit www.esri.com/sag.

For more information on presentations given at the 2006 ESRI International User Conference, visit gis.esri.com/library/userconf/proc06/index.html. Schedules and registration information for the 2007 ESRI International User Conference, June 18–22, 2007, in San Diego, are available at www.esri.com/uc.

Telecom Trends

By Randy Frantz
Telecommunications and LBS Industry Solutions Manager
ESRI

Giving Customers What They Want

I recently moved into a house in a new development and called to have my broadband Internet service installed. One service provider told me that my home didn't exist. The next told me that I didn't live in its service area; however, I had actually seen this company's crews installing its network in my neighborhood. Now, just a couple of months later, they have no idea where they built? This caused me to think about the untapped value that a GIS brings to the telecommunications industry.

When I first entered this business more than two decades ago, commercial cell phones were not available, fiber wasn't in the local loop, and end user multimegabit services were unimaginable. Technology makes our industry dynamic and is the lifeblood for delivering the next generation of services. Now integrated services of voice, video, and high-speed data are possible, and we often have several providers to choose from. Isn't it wonderful? Not really! Telecoms are still not meeting customer needs because they are still struggling with issues like serviceability.

Despite the availability of powerful GIS tools for design and construction, some telecoms are still operating as if it were the 1980s. Fortunately, many companies are recognizing that, to compete effectively, they must improve their business processes and operational support systems, and GIS provides a solution. The bottom line is that geography matters in the telecom industry, and GIS technology is useful for much more than just mapping the network. It enables sharing of information and collaboration between individuals and organizations.

When that advanced broadband network was built in my neighborhood, an engineer designed the plant and crews built it, but the information flow stopped there. I never received a sales pitch. No one sent me a marketing flyer. The salesperson did not even know I existed. By using GIS at the front end of its project, the company would have possessed a multifunctional tool for designing, deploying, and managing its network as well as for integrating marketing and operations.

In other words, the sales agent would have immediately accessed current network information and been prepared to sell me the service I wanted.

Telecommunications companies are already leveraging geospatial information to improve these types of efficiencies throughout their organizations. This and future issues of *Telecom Connections* will highlight leading-edge companies that deploy and benefit from using GIS. If you would like more information on the applications discussed here and others, please contact me at rfrantz@esri.com.

Best regards,

Randy

Ball State University Pioneers GIS Telecom Application

That guy in the cell phone commercials who wanders the country saying, "Can you hear me now?" quickly became a pop culture icon. But technology now being honed and marketed by afterimage GIS, a startup company that sprang from the work of an innovative IT project at Ball State University in Muncie, Indiana, could make him as obsolete as the Maytag repairman.

Like many successful ventures, the university's Office of Wireless Research and Mapping (OWRM) came into existence serendipitously. Its genesis was the Digital Middletown project, which was funded by the U.S. Department of Education and designed to test the value and impact of long-distance, high-bandwidth wireless technology in a community setting.

The idea was to install a wireless network to reach a pair of elementary schools near the university, extend the network into the surrounding neighborhoods, and then experiment with a variety of educational delivery models and new media concepts. To make their technology work, university researchers began exploring methods to measure the strength of their wireless signals and how the contours of the land would affect the reception of those signals in various parts of the target neighborhoods.

The researchers found ways to combine GIS technology with Cellular Expert, radio frequency (RF) analysis software from HNIT-Baltic, UAB, ESRI's distributor in Lithuania. The upshot was a way to create sophisticated three-dimensional models that predict how well wireless signals can be delivered to specific areas. It allows radio path profiling, coverage prediction, and drive-test analysis in relation to 3D maps of existing terrain, vegetation, and even buildings. The visual representations of the models look like giant mushrooms hovering over images of actual neighborhoods, clearly revealing where signal strength will be strong and where it will be weakened or blocked altogether by hills and other features.

"We found that we were the only academic institution in the country to have this software," says Paul Shanayda, then advanced graphics and GIS coordinator in University Computing Services. "We wondered, Would this be of value to business?"

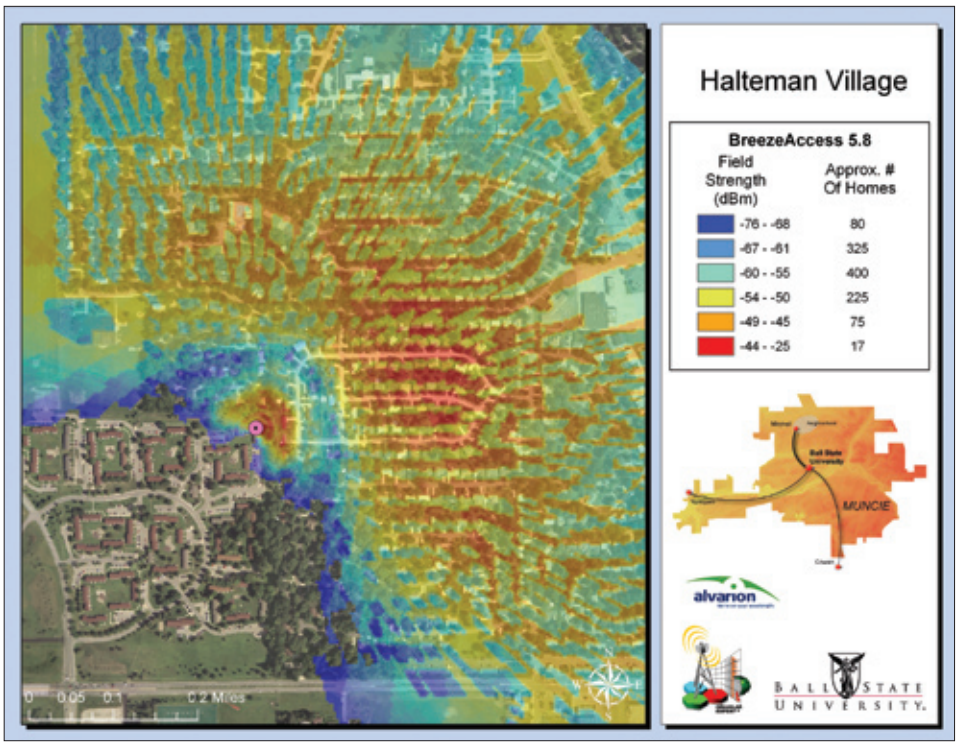
The answer was a resounding Yes!, and it led to the formation of OWRM to handle the burgeoning activity. Service providers can use the information generated by Ball State's models in a variety of ways. It can help them locate ideal places to build communications towers that offer the best and most reliable coverage for the greatest number of people, it can help them pinpoint potential trouble spots, and it can facilitate sophisticated and highly targeted marketing by indicating which residents in an area can receive service and which cannot. In addition, business analysis software that runs in tandem with the GIS returns consumer information on those residents and their potential as wireless subscribers.

"We can tell which neighborhood has high expenditures on software and hardware or where the more likely neighborhoods are in terms of those that might seek out high-speed wireless broadband," says Shanayda. "We take the RF propagation model and mix it with a model we have developed in ESRI's Business Analyst to come up with a third output, so we are not just saying, 'These are your neighborhoods from Business Analyst,' but also 'This is how it meshes with the propagation analysis.' That is what is so key about using GIS."

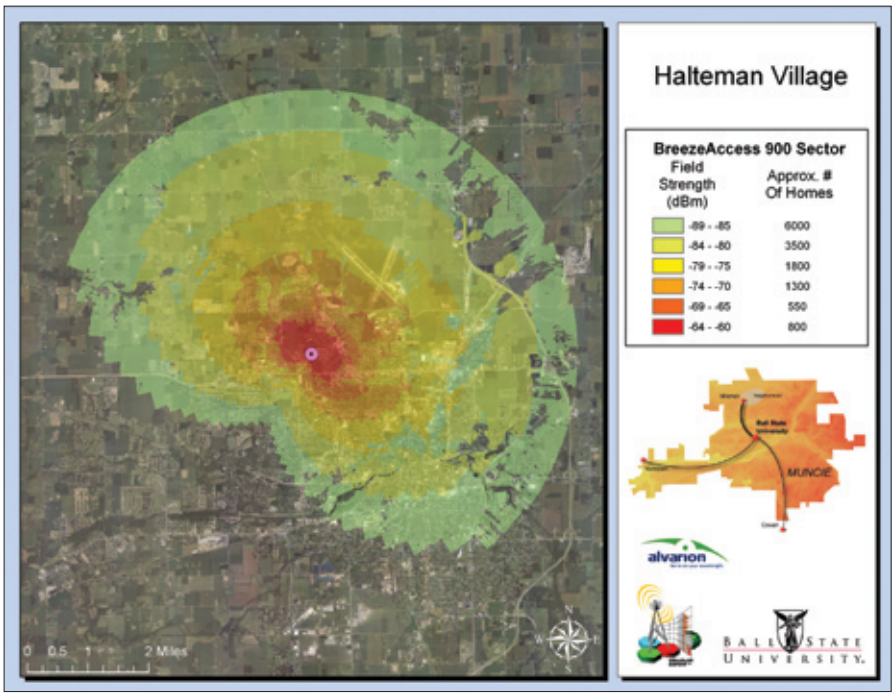
It wasn't difficult to find companies eager to tap into the unusual expertise Ball State was developing. Indeed, some of the partners in the Digital Middletown project were among those excited by the potential; telecom giant Verizon was one of the first to recognize the benefits. Wireless broadband providers such as Digital Bridge Communications and Omnicity soon followed. The university also was asked to use the technology to prepare RF maps for parts of Vermont and Virginia.

"To some degree, you could say that GIS technology with wireless mapping capabilities is now that one other essential enabling technology that makes it cost efficient for us to deploy wireless all around the world," says O'Neal Smitherman, vice president of information technology at Ball State. "In terms of cost savings, they are huge because, if you don't know where the coverage is, then you have to send a truck and people out and have them test each different spot."

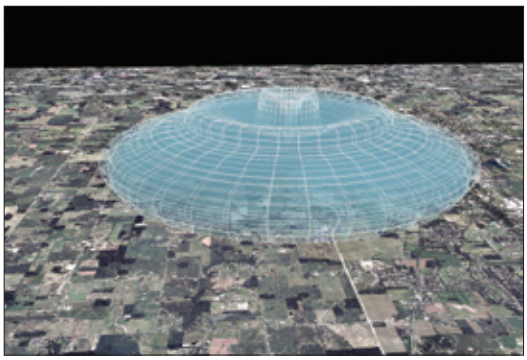
The university sees its involvement as appropriate because it is interested in ensuring that people living in rural areas have the same broadband connectivity opportunities as those in big cities. According to Smitherman, "We literally are in the information age, and being digitally connected is like the superhighway system in that, if you are not connected, you



Field strength prediction of 5.8 GHz coverage for the neighborhood deployment portion of the Digital Middletown project



Field strength prediction of the 900 MHz, 120-degree sector antennas with only the usable signal displayed



A three-dimensional view of the 900 MHz omnidirectional antenna coverage deployed for the Digital Middletown project using aerial photography

can't participate in this huge new economy that is driven by information and connectivity."

"We've gotten a lot of publicity from this project," says Bizhan Nasseh, executive assistant to the vice president for information technology, lead researcher in the Digital Middletown project, and current head of OWRM. Indeed, *CIO* magazine honored Ball State and the Digital Middletown project in 2006 with a CIO 100 Plus-One award for innovative practices in business and information technology. OWRM now partners with startup company afterimage GIS, which is promoting the use of mapping technology in telecommunications from offices in the Innovation Connector, a business incubator operated cooperatively by Ball State, Cardinal Health Systems, and the City of Muncie.

With Shanayda as its president, afterimage GIS is currently in charge of the frequency mapping portion of a new project to test WiMAX capacity on the Ball State campus in partnership with OWRM, Alverian, and Digital Bridge Communications.

For more information on the Digital Middletown project, visit www.bsu.edu/digitalmiddletown; contact Bizhan Nasseh, Office of Wireless Research and Mapping, at bnasseh@bsu.edu; contact Paul Shanayda, afterimage GIS, at pshanayda@bsu.edu; or visit www.afterimagegis.com.

Note: This article is adapted and reprinted with permission by Ball State University. The original article, "Mapping a New Company—From Digital Middletown to afterimage GIS," written by Steve Kaelble, first appeared in *BeneFacta* (Ball State University, September 2006). To view the online version of the publication, visit www.bsu.edu/benefacta. Copies of the printed publication may be acquired by contacting the Office of Academic Research and Sponsored Programs, Ball State University, Muncie, Indiana 47306, or e-mailing mddeboy@bsu.edu.

GIS Model and the Digital Middletown Project

While developing and testing the model, the networking team made field spot checks as they tried different types of antennas. Signals reached up to 54 MBps full duplex, for 5.8 GHz, at distances as far as seven miles.

"In our tests with the university, our models were compared with field tests, and the accuracy was very good," says Brian Hatton, GIS analyst for the project and now chief technology officer at afterimage GIS. "The good thing about the GIS software is that we can take field readings, bring them back to the model, and actually tweak the model to make it match with reality. In cases where the models are off, we have the opportunity to learn how different environments affect the signal."

Technical Information

Company	Wireless Networking Equipment
Proxim Corporation	Tsunami 100 Wireless Ethernet Bridge Tsunami QuickBridge
Alvarion	BreezeAccess
Xirrus	Wireless LAN Array
Company	**GIS Software**
HNIT-Baltic	Cellular Expert 3.3
ESRI	ArcGIS ArcInfo, ArcGIS ArcEditor, Business Analyst, ArcGIS Spatial Analyst and 3D Analyst extensions
Company	**Computer Technology**
Gateway	Laptops for the classrooms
Dell	Precision 470s for model building and analysis
Company	**Media Content**
United Streaming	High-definition content (Discovery Channel)
Public Broadcasting System	High-definition content

GIS Powers Danish Fiber Deployment

Broadband penetration is growing rapidly, and Denmark is leading the charge. According to the June 2006 Organisation for Economic Co-operation and Development (OECD) report, Denmark has the highest broadband penetration with 29.3 subscribers per 100 inhabitants. If the Danish electric utility companies have their way, this number will continue to grow.

In 2005, the Danish government issued a statement saying that all households in Denmark should have an option to be connected to a broadband service. The guideline was the result of a long-term national strategy to position Denmark at the forefront of IT technology innovation worldwide. The ambitious broadband goal should be reached quickly—within two to four years. For high-density areas, cable/fiber solutions will provide the connection. Fiber and cable solutions have high initial costs because more than 60 percent of the investment goes to digging and establishing the physical network when installing new or extending fiber networks. Therefore, they require greater numbers of customers to be profitable.

Denmark occupies a peninsula north of Germany as well as numerous islands in the Baltic Sea. Its roughly five million residents form 2.5 million households and support 3.5 million telephone lines spread over 43,000 square kilometers of mainland and islands. The majority of Danes already have access to some broadband services. Ninety-eight percent of households and companies have access to ADSL service, and 60 percent of the households have access to cable modem service. Despite these already high levels of broadband access, power companies saw the government's IT goal as an opportunity to diversify their business and create new and profitable sources of revenue.

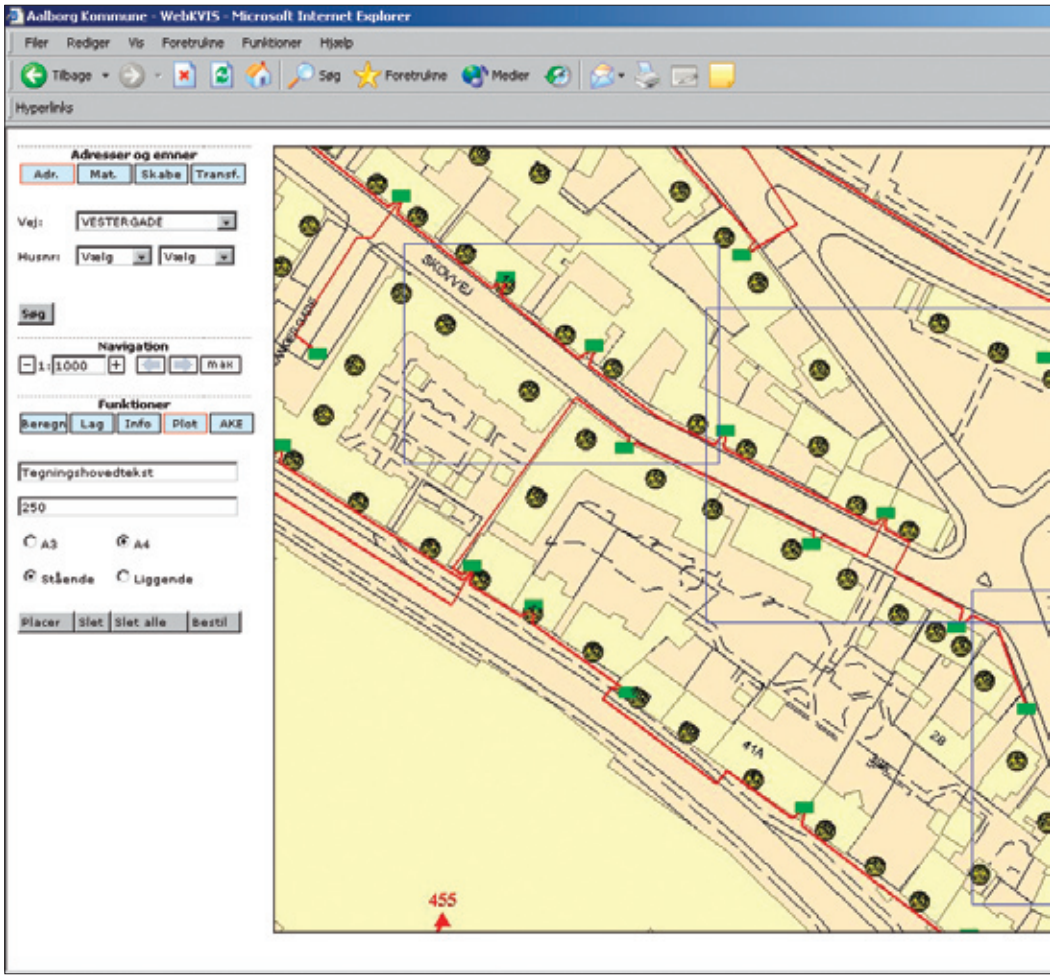
As a result, several major power companies banded together and launched fiber-to-the-home rollout plans to cover large areas of Denmark. More than 500,000 households and businesses should be covered within the next 18 months, and this will extend to more than 1.2 million households in the near future. The goal is to deliver networks ranging from speeds of 2 to 10 MBps up to an ambitious 100 MBps to accommodate radio and television content.

For example, the EnergiMidt company has earmarked an investment equal to its current annual net sales revenue, approximately DKK 1 billion (US$168 million), to start up its fiber broadband division. EnergiMidt is a large co-operative utility company located in the central area of Jutland and owned by its 162,000 customers. Within five to seven years, the company expects to offer fiber broadband connections for delivering lightning-fast Internet, worldwide television channels, and a series of broadband services to all its customers.

The first challenge EnergiMidt and other utility companies faced was how to efficiently deploy these fiber-based services in a highly competitive environment. For help, they turned to Informi GIS A/S, ESRI's distributor in Denmark, which has been providing GIS solutions to the Danish utility market since 1993.

When the fiber cable concept started gaining widespread acceptance, Informi quickly saw the need for a specialized solution to handle the new fiber network, and it began looking for quality products that could fulfill market demand and integrate with the ESRI solutions the utilities were already using. Network Engineer, a communication network application made by New Jersey-based Telcordia Technologies, Inc., and based on the ESRI ArcGIS platform, proved to be a solid and powerful solution that could handle the requirements for designing, documenting, and managing the fiber deployments.

DONG Energy, which, among other activities, distributes electricity to more than one million customers in the Greater Copenhagen and north Zeeland areas, is laying more than 3,000 kilometers of optical fiber cables to prepare its broadband network. Its enterprise GIS not only keeps track of the fiber network but also integrates its customer database. As a result, customer service personnel are able to view an online map of the actual



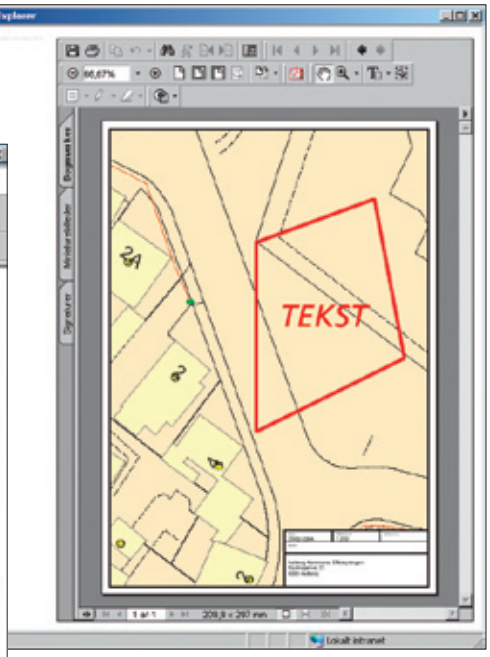
distribution network when fielding calls from customers and potential customers.

Thor Gerner Nielsen, GIS manager for the DONG Energy fiber project, reports that service agents now have a visual picture of the exact serviceability area, which is a great improvement over the previous method that required searching through potentially inaccurate lists of customers who live in a covered area.

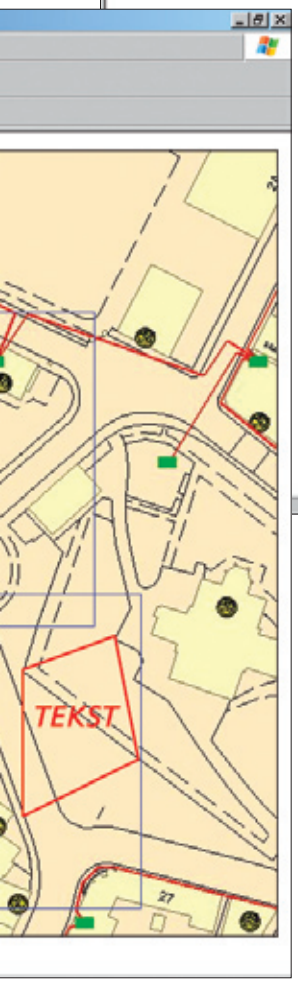
"Using the ArcIMS connection and our customer database, our customer care people can easily visualize information about the client, which is a great benefit," says Nielsen. "We know where all our cables are, who can be connected, who requested a connection, and who is already connected. We can also generate reports."

As a result of the successful use of GIS for fiber deployment in the Danish market, personnel from nine utility companies formed a GIS user group to discuss technical challenges and development projects they hold in common. The user group soon realized that, as the fiber projects grew, other organizations needed access to the new network information. They needed an easy-to-use solution to monitor the network and perform simple editing tasks.

Informi came up with two Web-based solutions to meet these needs, e-NET Cable and e-NET Info. The e-NET Cable application is an Internet-based plot service application that uses Network Engineer data and ArcIMS to automate the tedious task of gathering and distributing information about the network. The companies were committing significant resources to handle map ordering, plotting, and delivery requests from contractors and other utility companies, and the process to gather all the relevant updated network information was inefficient and cumbersome. With the e-NET Cable solution, companies can offer a Web-based interface where copartners and other types of utility owners can access valid and current information about the cable network, which is updated daily. The e-NET Info application provides specialized tools for viewing, searching, plotting, and querying geographic data over the Internet or intranets. It saves time previously spent contacting mapping office personnel, identifying and requesting maps, and waiting for their delivery.



Reviewing ordered plots using e-NET Info



Plot ordering interface using e-NET Info based on ArcIMS

For more information on GIS fiber deployment in Denmark and other examples, contact Randy Frantz, manager, Telecom Industry Solutions, at rfrantz@esri.com or visit www.esri.com/telecom.

ESRI on the Road

ESRI Developer Summit
March 19–22, 2007
Palm Springs, California
All

CTIA Wireless 2007
March 27–29, 2007
Orlando, Florida
Wireless

Location Intelligence Conference
April 16–17, 2007
San Francisco, California
LBS

UTC Telecom 2007
May 6–9, 2007
Austin, Texas
Electric

The Cable Show
May 7–9, 2007
Las Vegas, Nevada
CATV

NXTcomm 2007
June 18–21, 2007
Chicago, Illinois
Wireline

ESRI 2007 International User Conference
June 18–22, 2007
San Diego, California
All

SCTE Cable-Tec Expo 2007
June 19–22, 2007
Orlando, Florida
CATV

OSP Expo
August 28–30, 2007
San Jose, California
Wireline

CTIA Wireless I.T. & Entertainment
October 23–25, 2007
San Francisco, California
Wireless

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SoftBank Group Creates Broadband and Mobile Synergies for New Services

vides a cost-efficient solution to integrate market analysis and facility management.

GIS creates a synergistic approach for SoftBank Group through integrated management of ADSL, fiber, and mobile phone services. Creation of a combined area/service analysis helps development of new service strategies.

GIS Automated Area Analysis System

"The system design for using GIS started about two years ago when we planned to shift from ADSL service to optical fiber service," says Kazuhisa Shibayama, SoftBank BB general manager of the Area Information Planning Department. "For example, we needed to analyze the areas to identify where existing ADSL customers were located and how much data speed improvement they would gain if they upgraded to optical fiber service."

After six months of preparing the system design for an enterprise, sales force automation system, engineers started building the GIS Automated Area Analysis System (GIS AAAS) and completed it one year later in March 2006.

This system enables the mapping of potential areas of high demand for Yahoo! BB service by calculating statistical variables such as capacity, data speed, and network length. The entire process is automated from data input to result output and uses ESRI's ArcView, ArcEditor, ArcSDE, and ArcGIS Server.

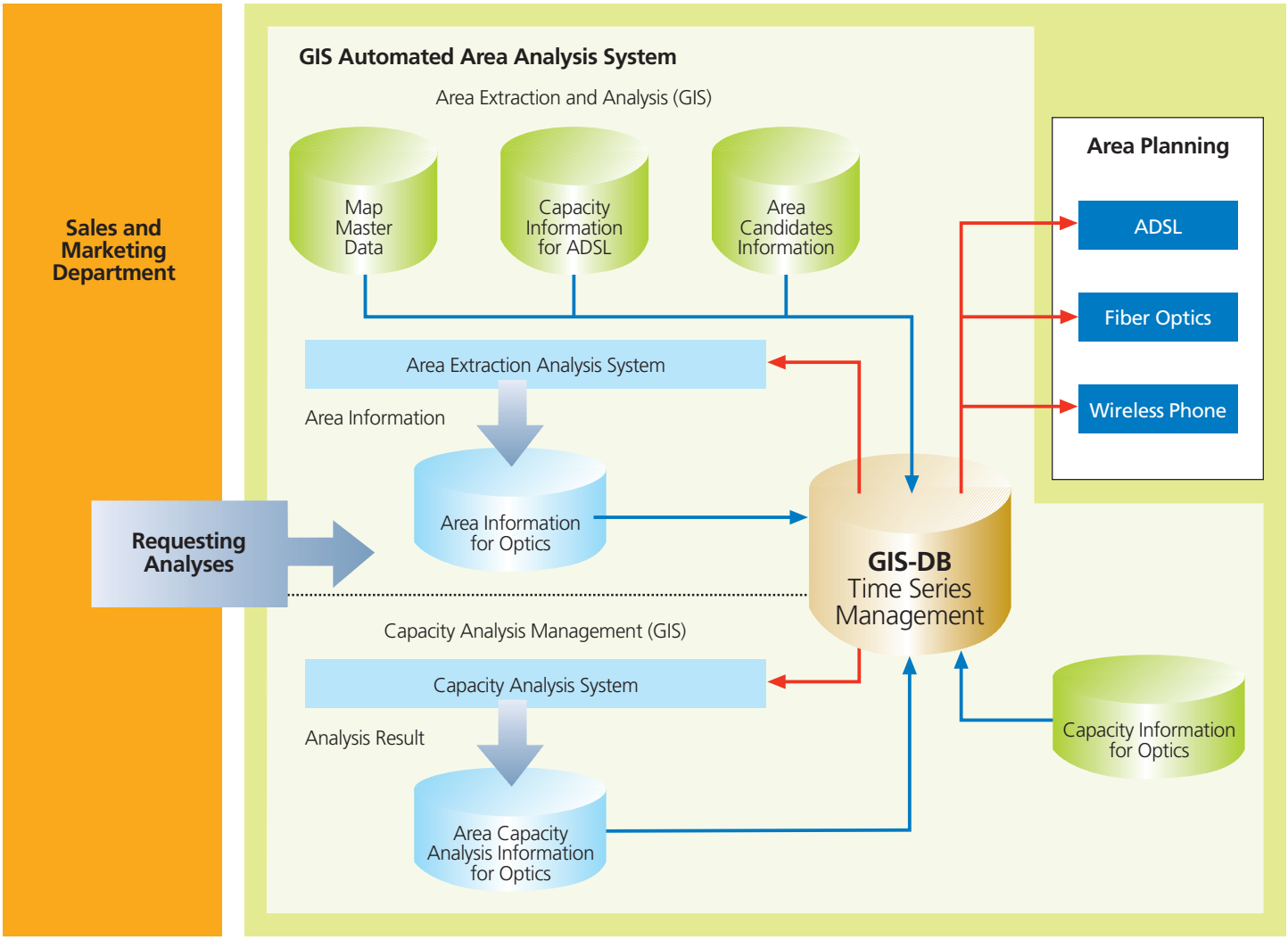
Not only is the GIS useful in preparing area analyses for the sales group, but it also functions as an integrated solution across functions, from mobile phone infrastructure planning (such as deciding where to build base stations) to traffic management used to control network capacity. For example, the system is used to analyze which areas have higher rates of operation based on current traffic data.

Just three months after the Vodafone purchase, planners were able to start using the GIS AAAS for mobile telecom area analysis. Now the system plays a major part in base station infrastructure planning.

Results

"It used to take two months to analyze nationwide data by hand, but now it takes four days with our automated area analysis," says Shibayama. "Without this system, division personnel would have to work day and night to collect the information."

For example, it now takes just 13 hours to create area analysis output for the Tokyo area, enabling delivery of near real-time analyses to sales division personnel.



Demand analysis and infrastructure planning process

Moreover, combining address data with building information provides more detailed spatial data than that previously used for ADSL marketing, which helps in developing strategies.

Because analyses use the most current capacity and spatial information, which is subdivided into finely detailed regions, both the accuracy and precision of the results have greatly improved. The inclusion of land-use and population statistics in the input data also increases reliability levels for analysis results.

Data management costs were also greatly reduced with the integration of spatial data that had previously been managed separately by each division.

Challenges

System builders faced and resolved many challenges during the 12-month development period.

"Because we overlaid various commercial data, public data, and statistical data, we spent a lot of effort establishing a standard data collection and analysis process," says Shibayama. They created a more detailed level of address coding for the system since, for example, it was difficult to assign coordinates to specific addresses in the Kyoto and Hokkaido areas. Government and map company datasets differ in their time frames and address standards. These variations caused other problems in setting a standard for the analyses.

The spatial database contains more than 60 million records. Since the data was worked with over time, the number of records expanded by several magnitudes. The extreme data flow volume caused serious problems in response times for the database server.

Advantages

Selection of the GIS software was a result of careful investigation during the design stage.

According to Shibayama, "We selected ArcGIS for three main reasons. First, integrated data management using ArcSDE is more attractive than in any other software. ArcSDE functions match our idea of efficient system integration at the first stage of system development.

"Second, the ArcGIS shapefile format is a standard format in the GIS world and makes it relatively easy to change the format of purchased data. For example, if not all the data we need is available for purchase from one company, we have the flexibility to overlay map data by purchasing partial data from another company.

"Third, support is available locally through ESRI Japan. We considered open-source GIS software at one point but removed it from the candidate list since there was no help mechanism for troubleshooting."

Plans for the Future

Since developing a useful, efficient platform with the GIS AAAS, SoftBank BB personnel are optimistic about further applications. Area Information Planning Department personnel continue working hard to expand system functionality.

A recent development has been to provide a browser that allows SoftBank BB workgroups working on related projects to have intranet access to analysis results. Looking forward, engineers plan to add new functionality that permits feature editing, uploading directly through the intranet, and calculations and analysis with animation on the browser.

They are also preparing a browser-based facility data management system that reduces the need for expensive CAD applications and results in maintenance cost savings.

Summary

Team members successfully used GIS technology to build a solid platform for expanding telecom services with combined ADSL, fiber, and mobile phone networks.

Team members are pleased that they accomplished the work in-house, which puts them at the forefront of building telecom networks and services in Japan.

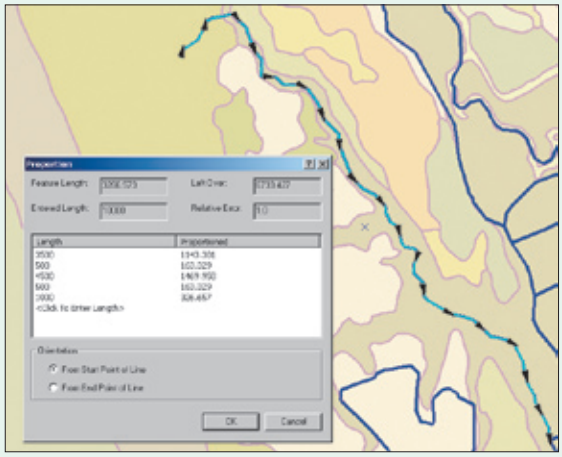
New efficiencies created by the GIS platform are expected to contribute beneficial synergistic effects within the group and to enhance telecom services in the future.

For more information on the SoftBank BB GIS system, contact Yuri Sasaki, ESRI Japan, at daisuke_sasaki@esrij.com. For more information about SoftBank BB, visit www.softbank.co.jp/en/index.html.

ESRI Best Practices Series: Case Studies from Your Industry

Free Booklets Showcase Users' GIS Stories

How are real users succeeding with GIS in your industry? To help you find out, ESRI has put together a free, downloadable case study series relevant to your specific field. The GIS Best Practices booklets are discipline-driven collections of previously published ESRI articles that highlight the work of your peers, suggest solutions for your GIS challenges, and help you develop your business case. To date, ESRI has published more than a dozen GIS Best Practices booklets, in PDF format, on a variety of topics such as public works, law enforcement, and ArcMap editing tips and tricks. Stay tuned, because more than 20 additional titles will become available throughout 2007. For a complete list of the currently available GIS Best Practices booklets, visit www.esri.com/bestpractices.



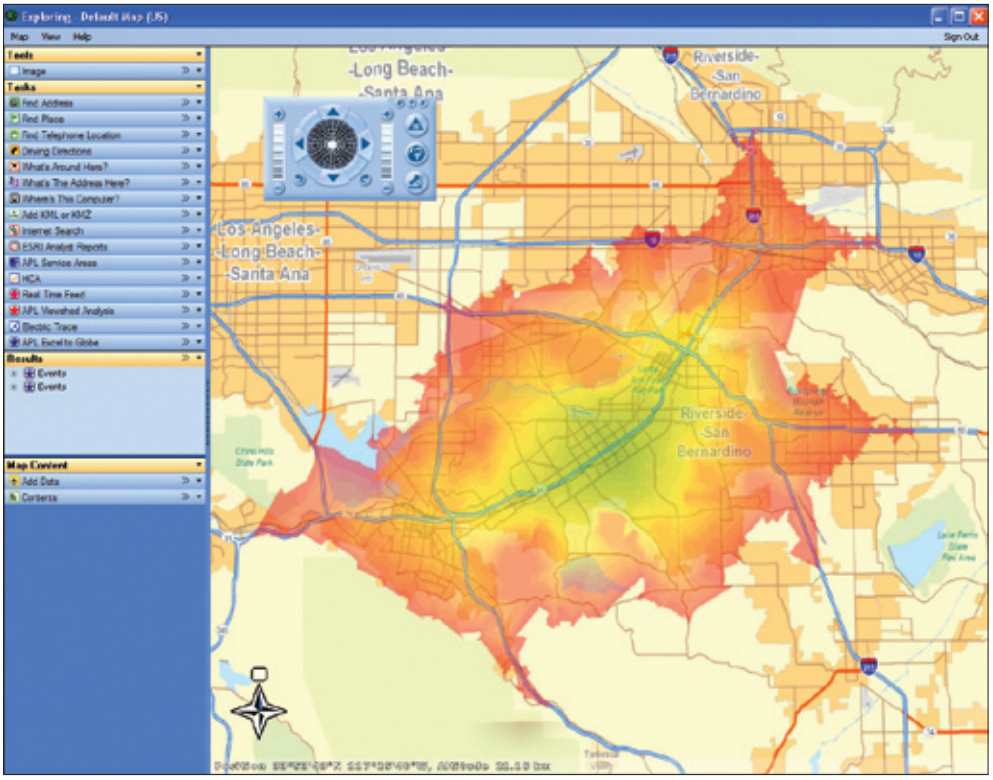
Use the Proportion command to split a selected line feature into a number of segments based on distance values. From GIS Best Practices, *Be More Productive with ArcGIS: ArcMap.*

Latest ArcGIS Software Release Makes It Easier to Author, Serve, and Use Geographic Knowledge

ArcGIS 9.2 Is Now Available

ESRI's ArcGIS 9.2 is a full release of ArcGIS Desktop (ArcInfo, ArcEditor, ArcView, and ArcReader), ArcGIS Engine, ArcGIS Server, and ArcIMS. ArcGIS 9.2 introduces a new way of sharing and accessing the rich geographic knowledge maintained in a traditional GIS to make users more productive.

"By including all of the ArcGIS technology in a server environment and providing a family of new, easy-to-deploy applications and clients (Web, desktop, and mobile), we anticipate major growth in GIS deployment and use," says Jack Dangermond, ESRI president. "Together, the desktop, server, and new thin-client tools provide a complete system for authoring, serving, and using geographic knowledge by all types of users."



ArcGIS 9.2 lets you deliver GIS capabilities to large numbers of users over networks with server-based GIS.

Highlights of the ArcGIS 9.2 release include

- Usability and quality enhancements that include an entirely new help system featuring intelligent search and an improved tables experience in addition to new navigation tools and keyboard shortcuts designed to make you more efficient and productive in your GIS work.
- A new method for storing cartographic representations in the geodatabase and a suite of advanced drawing and symbolization tools to help you automate tasks and perform the complete cartographic production process within the GIS.
- Server-based GIS with ArcGIS Server, which allows you to serve models and applications authored with ArcGIS Desktop as GIS services that can be consumed by browser-based, desktop, and mobile clients. ArcGIS Server also comes with the new ArcGIS Explorer client, which supports a wide variety of 3D mapping services as well as geoprocessing services for spatial analysis.
- New visualization and analysis tools that allow you to create, play back, and export time-based animations and graphs of how processes evolve, thereby revealing patterns and trends that help you make better decisions.
- New tools and wizards that make it easy to set up and manage a geodatabase. ArcGIS 9.2 also includes high-precision coordinate storage and greater flexibility in distributing your enterprise GIS data. You can create and share complete or partial database replicates (copies), synchronize and reconcile edits and changes, and create archives of transaction histories, allowing for improved collaboration and data sharing between departments, organizations, and field staff.
- Support for a growing array of open data standards including Open Geospatial Consortium GML Simple Features data, the ISO 19139 metadata standard, and DXF and KML. In addition, there is enhanced support for reading, exporting, and working with CAD drawings from AutoCAD and MicroStation.

All ArcGIS 9.1 users who are current on their maintenance will automatically receive ArcGIS 9.2 at no additional cost. For more information about ArcGIS 9.2, visit www.esri.com/whatsnew.

Telecommunications Geodatabase Model Now Available

ESRI's Professional Services group recently developed a new geodatabase model for telecommunications, and it is available for download on the ESRI Web site. ESRI software users can configure and customize the ArcGIS telecom design template to meet their own needs for network design. The model

- Provides a tool for maintaining accurate records of telecommunications networks and associated infrastructure
- Supports network infrastructure mapping of fixed line (copper and fiber-optic) cable networks, ducts, poles, terminals, and other associated equipment
- Supports network tracing at the copper pair and fiber levels

The model can be accessed through a link at www.esri.com/telecom in the Resources—Support section or by going directly to www.esri.com/datamodels and clicking on the Telecommunications section. For additional information on the ArcGIS telecom design template, contact Don Carson, manager, utility solutions team, via e-mail at dcarson@esri.com.

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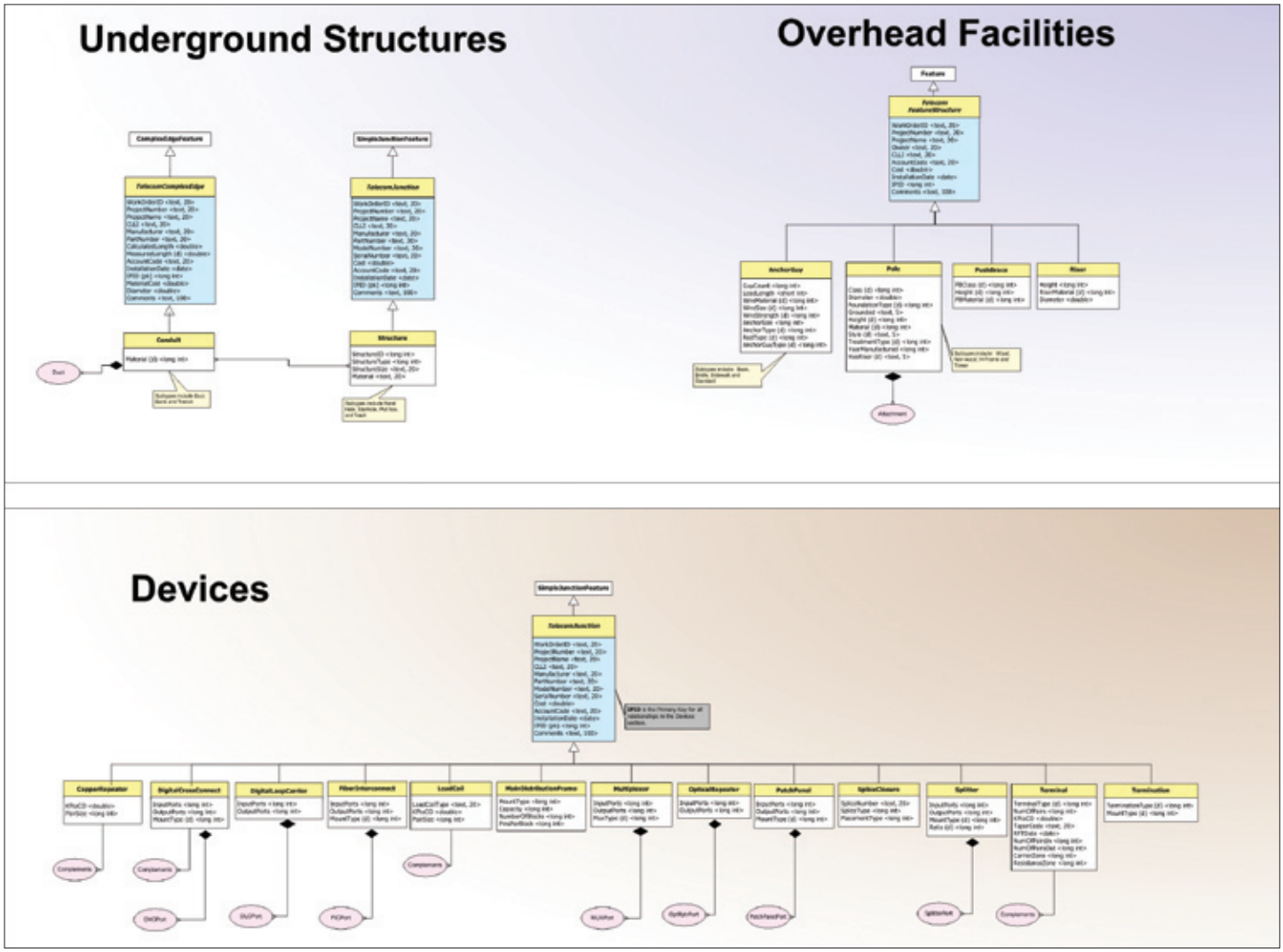
With more than 25 to choose from, Instructional Series and Speaker Series podcasts are the newest way to receive free ESRI software training on demand. The podcasts provide short, focused training that fits easily into anyone's schedule and can easily be downloaded on a computer or MP3 player. New podcasts are published often on a variety of topics to help you get up to speed to become a more successful GIS user. Subscribe to the podcast feed at www.esri.com/podcasts to be notified when new content is available.



Part of the ArcGIS telecom cable model developed by ESRI's Professional Services Group

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