"Explore Fullerton" An ArcGIS Server Web Application
Patrick Ward, University of Redlands

Abstract
The City of Fullerton, California, is home to a revitalized downtown business district, five institutions of higher education, and three critical freeways. "Explore Fullerton" is an ArcGIS Server Web mapping application that promotes tourism for the numerous businesses located in and around the city's central business district (CBD). The application also displays the city's streets, traffic control points, road projects, parking lots, parks, and city boundary for the public to view. Moreover, because the application is driven by ArcGIS Network Analyst extension, residents can geocode two addresses within the city limit and receive driving routes as well as written step-by-step directions. The application was built using ArcGIS Server Manager's out-of-the-box functionality, and customized with VB.NET in Microsoft Visual Studio 2005.

Methodology
Using data supplied by the City of Fullerton and the ArcGIS Network Analyst extension, a network dataset was created to produce optimal driving routes. Destinations within the CBD, such as restaurants, bars, and historical sites, were geocoded and symbolized based on establishment type. A map document and address locator were published to the Web with the application. An application was then built, allowing users to query for destinations by establishment name or type. Using the NAService extension from ESRI's Developer Network and VB.NET in Microsoft Visual Studio 2005, a second application was developed. This application allows users to enter an origin and destination address and then returns a driving route with written step-by-step directions.

Introduction
Over the past 20 years, Fullerton's CBD has been revitalized and now offers many new amenities, such as free wireless Internet service, decorative walkways, gathering areas, sidewalk cafes, gourmet restaurants, unique shops, and luxury apartments. This part of the City also offers a vibrant night-life with bars and pubs frequently crowded with students and tourists alike. The Fullerton Transportation Center is located at the Burlington Northern Santa Fe Railway's original Fullerton stop. Amtrak and Metrolink, the regional commuter train service, run daily from the station. The center is also a major bus depot for the Orange County Transportation Authority. As a result, downtown Fullerton is now a destination for visitors from all over Southern California.

System Architecture
The application, powered by ArcGIS 9.2 Server, was built using ArcGIS Server Manager. The authored map content was itself created using ArcGIS 9.2 Desktop applications, such as ArcMap and ArcCatalog. Once the map content is authored and the administrator has published this content on the Web, the user can connect to the Web application via the Internet over a wide area network (WAN) to explore the data, query for destinations or road projects, and print the map. The authored data is stored on the administrator's computer in a Database Server using SQL Express. When the user explores the data or creates a driving route, the GIS Server will host the returned information as services. The GIS Server has two parts: the Server Object Manager (SOM) and the Server Object Container (SOC). The SOM manages all the services on the server. The SOC reads and processes the data and returns maps and information to the user. The SOM manages SOC processes and creates new SOC processes as needed to service requests.

Results
The application allows users to enter a Starting from and Arriving at address to obtain an optimal driving route with written step-by-step directions. Once users click the Find Route button, the application will geocode the two addresses and returns a new map display with a drawn route, directions, and an estimated time of arrival. The example below has a starting address at Fullerton Transportation Center, 120 East Santa Fe Avenue and a destination address at the Fullerton Transportation Center, 120 East Santa Fe Avenue. The application delivers the route based on a hierarchy where streets with higher speed limits are traversed first. Step-by-step driving directions with time windows based on speed limit and street segment length are also returned.

Conclusions
"Explore Fullerton" is a useful tool for the City of Fullerton to promote tourism to the CBD. Residents and visitors of Fullerton have access to knowledge about attractions within the city, and can easily get directions to these attractions through the use of "Explore Fullerton." What makes "Explore Fullerton" more valuable is that it can be accessed from any Internet-equipped computer at any time. Planning trips, finding efficient routes, and having knowledge of road construction projects are truly simplified with "Explore Fullerton." With the service and information provided by "Explore Fullerton," the flourishing town has a place to continue to map its growth.

Further Work
In order to simplify the means of accessing a route and directions, text boxes could be programmed to be automatically filled in. Users of the application could click on a destination point and the route finder could automatically be filled with the destination address. Also, when users search for a destination by type, they receive a list of possible destinations. Upon selecting a destination, the application could be programmed to automatically zoom to a large scale map of the destination. This would allow users to view the location of their choice without having to manually zoom. Another area to improve deals with the destination attributes. One attribute in the results panel is website. Websites could be hyperlinked to allow the user to click the link and view the website automatically open in a new window. With the additional improvements discussed, the application could be customized to more effectively meet users' needs.