

## Introduction

To better serve the developers and users of the World Wide Web, MapInfo has developed MapXtreme, software that enables you to create Web pages with integrated mapping capability. When using MapXtreme, Web users can display a map to visualize data that would otherwise be lost in the rows and columns of a typical database.

MapXtreme Java Edition, a Web application development tool, helps experienced Web developers create exciting and useful Web pages by adding mapping capability to a Web site. With MapXtreme, you will be able to deliver robust mapping applications via the Internet or a corporate intranet.

# 1 Chapter

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### What Is MapXtreme Java Edition?

MapXtreme Java Edition is a mapping application development tool for organizations who recognize that data visualization and mapping can help them make better business decisions and manage assets and operations more effectively. Applications running on a managed server network offer huge economies of scale including lower hardware and administrative costs while dramatically improving application performance, reliability, and security. Companies who once found mapping costs prohibitive, can now deploy applications at a lower cost per user than ever before. Applications built with MapXtreme Java are appropriate both for corporate intranets and the public Internet.

### Product Contents

MapXtreme Java is a set of 100% Pure Java classes (Java 2 compliant) allowing you to deploy your application on the system you have, whether it is Windows, UNIX, or both. The following components are included:

- MapXtremeServlet mapping engine
- MapJ API
- MapXtreme JavaBeans
- Map Definition Manager
- Connection Manager
- Java 2 VM
- Sample applications
- Sample data
- MapXtreme Java Documentation set (Developer's Guide, Object Model poster, API HTML Reference)
- HAHTsite 4.0 Application Server and IDE and product documentation

## Features

MapXtreme Java has been redesigned using a servlet architecture. This allows MapXtreme to focus on satisfying mapping requests, while the web server/servlet container handles other server-side issues such as load balancing, security, and fault tolerance. Additionally, the servlet model uses HTTP, the standard for communicating across the Internet. Other features of MapXtreme Java include:

- Sophisticated mapping capabilities such as selection behavior, theme mapping and analysis, and advanced labeling and rendering.
- Data source access through JDBC that allows you to maintain your spatial data on a secure RDBMS, yet still use it to its full potential to build maps.
- Conveniences for easier installation and configuration, development and deployment, such as JavaBeans, sample applications, an included Java 2 Virtual Machine (VM), Tomcat servlet container, and HAHTsite application server and IDE.

## Benefits

MapXtreme provides a multi-platform, high quality, high performance, easy-to-use solution for your mapping needs. The benefits of MapXtreme are many:

### Multi-platform

Because of the security, reliability, and performance, many end-user industries such as telecom and insurance use UNIX, while other users in areas of the same organization are working on Windows systems. Often there is a need to deploy a similar solution on many platforms. Java-based mapping applications allow developers to write a single program for use on multiple platforms that support virtual machines.

With MapXtreme Java Edition running on the server side, existing UNIX or Windows resources can be used. Data can be stored and manipulated on one system and programmatically accessed from another machine running a Virtual Machine.

### Highly Scalable

Organizations creating enterprise-wide mapping solutions with MapXtreme need applications that perform well and can support all users that need access. Since MapXtreme offers this component-based, reliable, and multi-threaded solution, its versatility is assured. Your application can grow with the needs of your organization.

### **Fast Deployment**

MapXtreme allows you to install, develop, and deploy your applications in a timely manner. It includes a commercial IDE and Application Server developed by HAHTsite Software and includes several sample applications that demonstrate the basics of MapXtreme Java. These sample applications can be specialized or built upon for your own applications. MapXtreme Java is compatible with all Web servers/ browsers and there are no proprietary plug-ins.

## **Programming Advantages**

### **Object Oriented**

MapXtreme is object oriented with an easy-to-use object model hierarchy for mapping display, query and analysis.

### **MapJ API**

The MapJ API is the client-side API used to communicate with MapXtremeServlet. Each client requesting maps from MapXtreme uses (or reuses) an instance of the MapJ object. MapXtreme has no proprietary plug-ins, so it delivers maps to any browser on any operating system.

MapXtreme is asynchronous, multi-threaded, and stateless for maximum performance.

### **Server-Side Java**

Most vendors of application software for use on the Web are providing solutions originally created as state-full, client-side tools which have been force-fit into a server environment. In contrast, MapXtreme was designed as a server-side Java component from the beginning. It was developed specifically to support:

- many concurrent users
- clusters of machines
- multiple CPUs per physical server
- virtually any platform (including Windows NT and the numerous UNIX versions)
- database connection pooling
- security issues that are not relevant in client-side implementations

Thus, MapXtreme Web-based mapping applications can scale to support the number of users that can be managed by your application server. MapXtreme will work efficiently with even the most heavily hit Web site in conjunction with web servers such as Apache/Tomcat, Java Web Server, Oracle Application Server, or WebLogics.

### **Intelligent Multi-Threading**

MapXtreme uses intelligent Java threading to serve multiple concurrent users efficiently. It has a low memory consumption per user and scalable user load as additional CPUs are added. Tests demonstrate that the MapXtreme server engine requires about 8 MB of memory in steady-state and 100 KB to 200 KB per concurrent user. For example, while one thread is processing a map request, three other threads could be streaming the results of three previous map requests via network I/O simultaneously.

### **Component-Based Flexibility**

MapXtreme offers great deployment flexibility because of its component-based architecture. There are four high-level components: the MapJ object, map Renderers to display maps, Data Providers to access various data sources, and MapXtremeServlet. MapXtreme can be used in a two-tier intranet deployment that puts MapJ on the client side, or a three-tier configuration for the Internet with MapXtreme Java and your business logic in a middle tier.

### **Strong Connectivity to Remote Data Sets**

MapXtreme embraces the trend to store spatial data in relational databases such as Oracle8i with the Spatial option and the Informix Dynamic Server with the SpatialWare DataBlade. This allows you to protect your mission-critical spatial data in an enterprise-level database management system while providing appropriate access to any user on the World Wide Web.

### **Compatible with any Web Environment**

MapXtreme's open architecture is compatible with virtually any Web environment (especially three-tier architectures) and works with any Web server supporting ISAPI, NSAPI or CGI gateways, such as Netscape, Apache, or Microsoft Internet Information Server. As a servlet environment, it provides all the benefits of Sun's Java Servlet API.

MapInfo recommends an environment architecture that includes an application server that can generate instances of Java objects, such as HAHTsite or Oracle Application Server. For rapid deployment and to eliminate having to purchase a separate Web application development environment, MapXtreme provides a pre-built sample application for HAHTsite and bundles the full HAHTsite Internet Development Environment (IDE) at no additional charge. Additionally, Apache Web Server and Tomcat servlet container are provided on the product CD.

Virtually any Web browser accepts MapXtreme-generated maps because MapXtreme can output map images as raster images such as GIF or JPEG which can be embedded in HTML. More capable browsers (or browsers with a 1.2 VM plug-in) can also receive vector data and display maps from these vectors. MapInfo recommends the use of Netscape version 2.x or greater, or Microsoft Internet Explorer version 2.x or greater.

### What Can You Do with MapXtreme Java?

Use MapXtreme Java to build two- and three-tier Web mapping applications that service requests from clients for map data. Its flexible, scalable architecture allows you to send as much or little software to the client for your mapping needs, control the access to sensitive data, and expand your application as the need arises.

### Learning MapXtreme

This Developer's Guide was created with the goal of giving you all of the appropriate information to accomplish your task. Be sure to read the Getting Started chapter. Not only does it help you understand the installation options available, it will walk you through the process of setting up your servlet container with MapXtreme.

If you are new to mapping applications, read the Mapping Concepts chapter to get a feel for the elements of computer maps. If you are still wrestling with the design of your application, see Chapter 4: Planning Your Application, for a summary of configuration options and considerations.

Once you have your design, Chapters 6 and 7 can help jump start your development with discussions on MapXtreme JavaBeans and creating custom servlets.

If the JavaBeans don't meet your needs, move on to the information provided in Chapters 8 through 11. The MapJ API is presented in these chapters to give you a good starting point for programmatically developing your MapXtreme application.

Chapter 12: Managing Your Data covers the Map Definition Manager where you can learn how to create map definitions and control the display of map layers.

This Developer's Guide is the best resource to start learning MapXtreme Java. There are several other sources of information useful to MapXtreme developers, including:

- MapJ API Specification in HTML - installed with MapXtreme
- Object Model poster of MapJ classes and methods
- MapXtreme Java on the Web: web resources at [www.mapxtreme.com](http://www.mapxtreme.com) including access to the Discussion Forum and KnowledgeBase.