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ESRI ArcIMS Architecture & the WMS Connector

ArcIMS was designed with a multi-tier architecture. A multi-tier architecture makes use of three or more tiers, each of which may make use of several applications or services. Figure 1 below shows the ArcIMS architecture¹, which consists of three tiers: (1) presentation tier; (2) the business logic tier; and (3) the data storage tier. These tiers describe logical groupings of the functionality of the various application components and do not necessarily correspond to their physical location.



Figure 1: ArcIMS Multi-tier Software Architecture (courtesy of ESRI)

The presentation tier includes the ArcIMS client viewers for accessing, viewing, and analyzing geographic data. The components in the business logic contain the components needed to run MapServices and process requests and responses. The components include the Application Server Connectors, the ArcIMS Application Server, and the ArcIMS Spatial Server. The framework also requires the Web server, JavaVM, and the servlet engine. The data tier includes all data sources available for use with ArcIMS.

ArcIMS System Components

Figure 2 below shows that the business logic tier of ArcIMS consists of the ArcIMS Application Server Connectors, Application Server, Spatial Server, and Manager as well as a Web server. The server components are used to process requests, create and run MapServices, and manage the site.

¹ The ArcIMS Architecture: An ESRI White Paper <u>http://supporrt.esri.com/</u>



Figure 2: ArcIMS System Components (courtesy of ESRI)

The ArcIMS Application Server runs as a background process and handles the load distribution of incoming requests. It also catalogs which MapServices are running on which ArcIMS.

The ArcIMS Spatial Server provides the functional capabilities for accessing and bundling maps and data into the appropriate format before sending the data back to a Web browser. The Spatial Server is a container for holding components that support different functionality as shown in Figure 3. Each of these components (i.e., Image server and Feature server) makes up a server type inside the ArcIMS Spatial Server.

ArcIMS Requests/Responses and the WMS Connector

When an ArcIMS request is made, it is first handled by the Web server, passed through one of the connectors, and then forwarded to the ArcIMS Application Server. The Application Server, in turn, dispatches the request to an ArcIMS Spatial Server for processing. The request/response cycle is shown in Figure 3, below.



Step	Action
I_{1}	Client sends a request to an ArcIMS site.
2	The Web Server receives the request and passes it to the Servlet Connector or
-1. A. A. S.	ColdFusion/ASP servers, which in turn hand the request to a connector.
3	The Connector opens a path for the ArcIMS Application Server to respond, and the request is handed from the connector to the Application Server.
4	The Application Server sends the request to an available Spatial Server within a Virtual Server group.
3	The Spatial Server generates the response as a
	Response XML string (such as query results or an image location) Stream of data
6	Response returns through the reverse order of the initial request,

Figure 3: Steps Taken by ArcIMS to Process a Request and Send a Response (courtesy of ESRI)

Since the Application Server can only process requests written in ArcXML², connectors are needed to either pass the ArcXML straight through or translate a WMS request (or third party syntax such as ColdFusion, ASP, or JSP) prior to forwarding the ArcXML request to the Application Server. Thus, the connectors provide a communication pipeline between a Web server or third party application server and the ArcIMS Application Server. The connectors communicate with the application server through TCP.

ArcIMS has four connectors, but we concentrate here on the WMS Connector, which processes WMS requests. This connector allows any OGC WMS-compatible browser or client the ability to access an ArcIMS MapService.

² The ArcXML Programmer's Reference <u>http://support.esri.com/</u>