

identified by a “Layer ID” to enable data from different sources to be deployed to the device and meshed for proper rendering. Each DEntry is representative of one or more artefact or label (or a combination of both) and includes coordinate information (also referred to as a “bounding box” or “bounding area”) to identify the area covered by the DEntry and a plurality of data points that together represent the artefact, feature or label. For example, a DEntry may be used to represent a street on a city map (or a plurality of streets), wherein the various points within the DEntry are separated into different parts representing various portions of the artefact or map feature (e.g. portions of the street). A wireless device may issue a request for the map server to download only those DEntries that are included within a specified area or bounding box representing an area of interest that can be represented by, for example, a pair of bottom left, top right coordinates.

[0056] As depicted in FIG. 3B, the wireless communications device issues one or more AOI (Area of Interest) requests, DEntry or data requests and Maplet Index requests to the map server for selective downloading of map data based on user context. Thus, rather than transmitting the entire map data for an area in reply to each request from the device (which burdens the wireless link), local caching may be used in conjunction with context filtering of map data on the server. For example, if a user’s wireless device is GPS-enabled and the user is traveling in an automobile at 120 km/h along a freeway then context filtering can be employed to prevent downloading of map data relating to passing side streets. Or, if the user is traveling in an airplane at 30,000 feet, then context filtering can be employed to prevent downloading of map data for any streets whatsoever. Also, a user’s context can be defined, for example, in terms of occupation, e.g. a user whose occupation is a transport truck driver can employ context filtering to prevent downloading of map data for side streets on which the user’s truck is incapable of traveling, or a user whose occupation is to replenish supplied of soft drink dispensing machines can employ context filtering to download public map data showing the user’s geographical area of responsibility with irrelevant features such as lakes and parks filtered out and private map data containing the location of soft drink dispensing machines superimposed on the public map data.

[0057] The Maplet Index request results in a Maplet Index (i.e. only a portion of the Maplet that provides a table of contents of the map data available within the Maplet rather than the entire Maplet) being downloaded from the map server to the device, thereby conserving OTA (Over-the-Air) bandwidth and device memory caching requirements. The Maplet Index conforms to the same data structure as a Maplet, but omits the data points. Consequently, the Maplet Index is small (e.g. 300-400 bytes) relative to the size of a fully populated Maplet or a conventional bit map, and includes DEntry bounding boxes and attributes (size, complexity, etc.) for all artefacts within the Maplet. As the field of view changes (e.g. for a location-aware device that displays a map while moving), the device (client) software assesses whether or not it needs to download additional data from the server. Thus, if the size attribute or complexity attribute of an artefact that has started to move into the field of view of the device (but is not yet being displayed) is not relevant to the viewer’s current context, then the device can choose not to display that portion of the artifact. On the other hand, if the portion of the artefact is appropriate for display, then the device accesses its cache to

determine whether the DEntries associated with that portion of the artefact have already been downloaded, in which case the cached content is displayed. Otherwise, the device issues a request for the map server to download all the of the DEntries associated with the artifact portion.

[0058] By organizing the Maplet data structure in Layers, it is possible to seamlessly combine and display information obtained from public and private databases. For example, it is possible for the device to display an office building at a certain address on a street (e.g. a 1st z-order attribute from public database), adjacent a river (e.g. a 2nd z-order attribute from public database), with a superimposed floor plane of the building to show individual offices (e.g. 11th z-order attribute from a private database, accessible through a firewall).

[0059] Referring back to FIG. 3A, within the network having map server(s) and/or LBS server(s) 321 and database(s) 322 accessible to it, all of the map data for the entire world is divided and stored as a grid according to various levels of resolution (zoom), as set forth below in Table A. Thus, a single A-level Maplet represents a 0.05×0.05 degree grid area; a single B-level Maplet represents a 0.5×0.5 degree grid area; a single C-level Maplet represents a 5×5 degree grid area; a single D-level Maplet represents a 50×50 degree grid area; and a single E level Maplet represents the entire world in a single Maplet. It is understood that Table A is only an example of a particular Maplet grid division; different grid divisions having finer or coarser granularity may, of course, be substituted. A Maplet includes a set of layers, with each layer containing a set of DEntries, and each DEntry containing a set of data points.

TABLE A

Level	Grid (degrees)	# of Maplets to cover the World	# of Maplets to cover North America	# of Maplets to cover Europe
A	0.05 × 0.05	25,920,000	356,000	100,000
B	0.5 × 0.5	259,200	6,500	1000
C	5 × 5	2,592	96	10
D	50 × 50	32	5	5
E	World	1	1	1

[0060] As mentioned above, three specific types of requests may be generated by a wireless communications device (i.e. the client)—AOI requests, DEntry requests and Maplet Index requests. The requests may be generated separately or in various combinations, as discussed in greater detail below. An AOI (area of interest) request calls for all DEntries in a given area (bounding box) for a predetermined or selected set of z-order Layers. The AOI request is usually generated when the device moves to a new area so as to fetch DEntries for display before the device client knows what is available in the Maplet. The Maplet Index has the exact same structure as a Maplet but does not contain complete DEntries (i.e. the data points actually representing artifacts and labels are omitted). Thus, a Maplet Index defines what Layers and DEntries are available for a given Maplet. A data or DEntry request is a mechanism to bundle together all of the required Dentries for a given Maplet.

[0061] Typically, AOI and Maplet Index requests are paired together in the same message, although they need not be, while DEntry requests are generated most often. For example, when a wireless device moves into an area for which no information has been stored on the device client, the Maplet Index request returns one or more Maplet Indexes for the AOI