ICE Technology Corporation

Active Information, Real-time Management

Enable real-time messaging ability for GIS

ICE Technology iPush Server

ICE Technology iPush Embedded

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Preface: The meaning of GIS

GIS (Geography Information System) is a projection of real world into information, which represent the geographic features and attribution. GIS may display and integrate complex geographic data to facilitate scientific study as well as many of the new applications. By now, the application of GIS may describe as follows:

Geographic Analysis

- (Politics) Population analysis of campaign
- (Agriculture) Co-relationship of soil and agriculture crop
- (Water resources) Water resources area analysis and
- (Environmental) Soil pollution area analysis
- (Environmental) Air pollution diffusion analysis

Logistic Management

- (Commercial) UPS on-line tracking
- (Commercial) Aviation flight data

Environmental Monitoring

- (Hazard prevention) Mud flood
- (Environmental) Pollution
- (Environmental) Air quality
- (Environmental) Field

Public Utilities Management

- (Electricity) Power Network / Monitoring
- (Water) Pipeline network / Monitoring
- (Gas) Gas Supply Network / facilities Monitoring
- (Sewer) Storm / sewer network management
- (Telecom) Telecom / WAN facilities management

Command and Dispatch

- (Police/Hazard) Accident notification / location positioning / dispatch
- (Military) Intelligence collection / analysis / notification / dispatch

The application of GIS should process both static geographic data and dynamic real-time data, or what we called “temporal event data”, which contains dynamic and sequential attributions. These types of data are manually or automatically feed from monitoring devices into database mostly to complete the acquisition of “temporal event data”, and GIS server may utilize these data from database. It is common for the analysis of statistic analysis on “temporal event data”. However, the trend of GIS application moves toward the quest for real-time response and real-time information era.

Why Real-time Messaging?

From ancient time, the message delivery has never stopped its path of progress. Changing from homing pigeon, courier station, telegraph, radio, telephone, cellular phone and Internet, man has been chasing for the speed and accuracy of message delivery.

What is “real-time messaging”

It’s common to find the usage mistake about “real-time messaging”. The message produced couple with events and sends to message consumers through publication or broadcast mechanism at the same time, rather than the message requested by receivers in time. To request message regularly would be able to achieve the message delivery “in time” but not “real-time”

The difference between message delivery “in time” and “real-time” would not be significant in the condition of limited information sources, receivers and short distance. But the differences become significant while these three conditions changes.

Why you need “Real-time messaging”

The application of real-time messaging may be listed as follows:

- To meet the challenge of serious competitions

  Stock, futures, currency market changes rapidly in nature, thus, real-time quote and information have become critical issues for investors. The faster accurate

information would help investor to make better decision making at the right time. This is the most typical real-time message delivery application.

- Real-time reaction (Pre-caution) for dangerous situation

Real-time intelligence information transmission and dispatch

For pre-caution and scenarios require fast response, real-time information would help the acceleration of response. These hazard pre-caution systems take the "true" real-time information to protect thousands of people's property and life, which deserve the latest real-time messaging technology application.

- Mud Flood monitoring
- Earth quake warning system
- Flood warning system
- Fire warning and intelligence
- Disaster scene intelligence
- Battle field real-time intelligence
- Radar and electronic intelligence system

Rapid command

More than the acquisition of real-time intelligence, to meet the challenge of disasters or catastrophes, quick command and resources dispatch would help effective execution of response decision-making. These are some good example for the application of real-time message technology.

- Fire extinguish resources dispatch
- Police force resources dispatch

- Stable Utilities Supply

Public utilities have become the foundation of modern civilization. The stable supply of electricity, water, gas and petroleum should count on effective real-time monitoring and quick trouble-shooting. Real-time messaging technology would be suitable for these critical monitoring cases.

Power network monitoring

Water pipeline monitoring

Gas pipeline monitoring

Telecomm Network / facilities monitoring

- Customization Needs

  Transportation and logistics has become important issue of modern economic activities, especially for cross-nation companies. Due to the introduction of JIT (Just-in-time) and custom-made concepts, the manufacturing flow should have better flexibility. Thus, the logistic should take care of details at real-time level.

  Cargo tracking

  Manufacturing process monitoring

The right technology for real-time message delivery

Programming controlled socket may achieve the goal for real-time message delivery, but it should take more knowledge and experience on communication protocols level, which implies high difficulties. In most of the cases, professional real-time messaging server for business non-stop operation should provide better flexibility and scalability for possible system upgrade/expansion, not to mention the secured and stable real-time message delivery as well as time-to-market.

ICE iPush® Communication Server

What is ICE iPush® Communication Server

ICE iPush® Communication Server (iPush® Server, the latest version is V2) is a message-oriented middleware (MOM); main goal is to be a general real-time communication delivery platform.

iPush® Server V2 not only keep previous Pub/Sub real-time massive connection superior service capability. Many of characteristics of real-time message delivery quality enhancement have been add to messaging kernel engine. Maximizing 1-to-n, n-to-n, n-to-1, and 1-to-1 information delivery service benefits.

Application developers are iPush® Server direct users. Therefore, variety of application programming interface (API) and advanced tools are provided as development package. Developer can easily develop variety of real-time message application system.

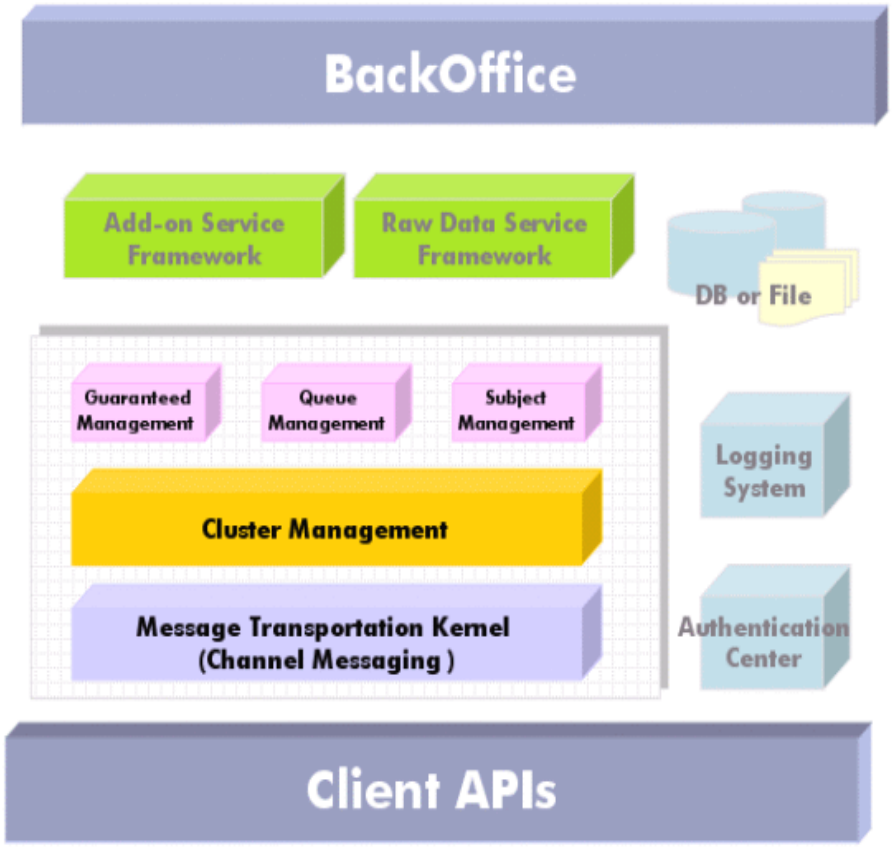

Figure 1. iPush® Server V2 system architecture

Eight distinctive features of ICE iPush® Communication Server V2

Massive

Goal of designing iPush Server is provide internetworking connection service to thousands of online users concurrently. To meet data transfer speed of data transportation to thousands of users like one and one only. This is not accomplished on any of message queue related products on market today.

Real-time

iPush Server will immediately push message to subscribed online user when any data is feed to iPush Server. (Base on units of ms)

Guaranteed Delivery

iPush Server Enterprise Edition provides feature of message guaranteed delivery. When user is offline or server stop providing service abnormally, system will preserve undelivered message until user is back online. Also under circumstance without user program termination, to accomplish once-and-only-once message delivery unicity.

High Availability

Through Cluster / Cluster Gold server farm deployment, your message application system will meet quality of service (QoS) capability such as load-balancing, fail over, fault tolerance, and scalability.

High Accessibility

By providing variety of application programming interfaces (APIs) support, from server to handheld devices with mainstream software development and operating environment. Purpose is to achieve single message at the same time broadcast to many different user through variety of terminals.

Security

3 levels of safety mechanism such as authentication, authorization, and encryption are standard specifications.

Content-independent	"Content-independent" is iPush Server another main design goal. Type of data adding scalability on processing message transport from present day to the future is extremely important. With this design goal, developers are in better position to meet rapid changing data management via internet and intranet.
Multiple Messaging Models	Beside Publish/Subscribe one-to-many message deliver model, another new Point-to-Point one-to-one message deliver model has been introduced.

When GIS meets Real-time Messaging

1. Existing Practice

- Server Side (existing practice #1)
  - Reach the latest positioning and measurements figure from database through GIS Server
  - The positioning and measurements figure calculated by GIS Server, which may put the result tag on the map
  - Transmit the calculated tag to client side for display

Defects

1. Meet the needs for historical statistics and analysis. Not suitable for real-time reaction applications
2. Overdrive GIS server and database server.

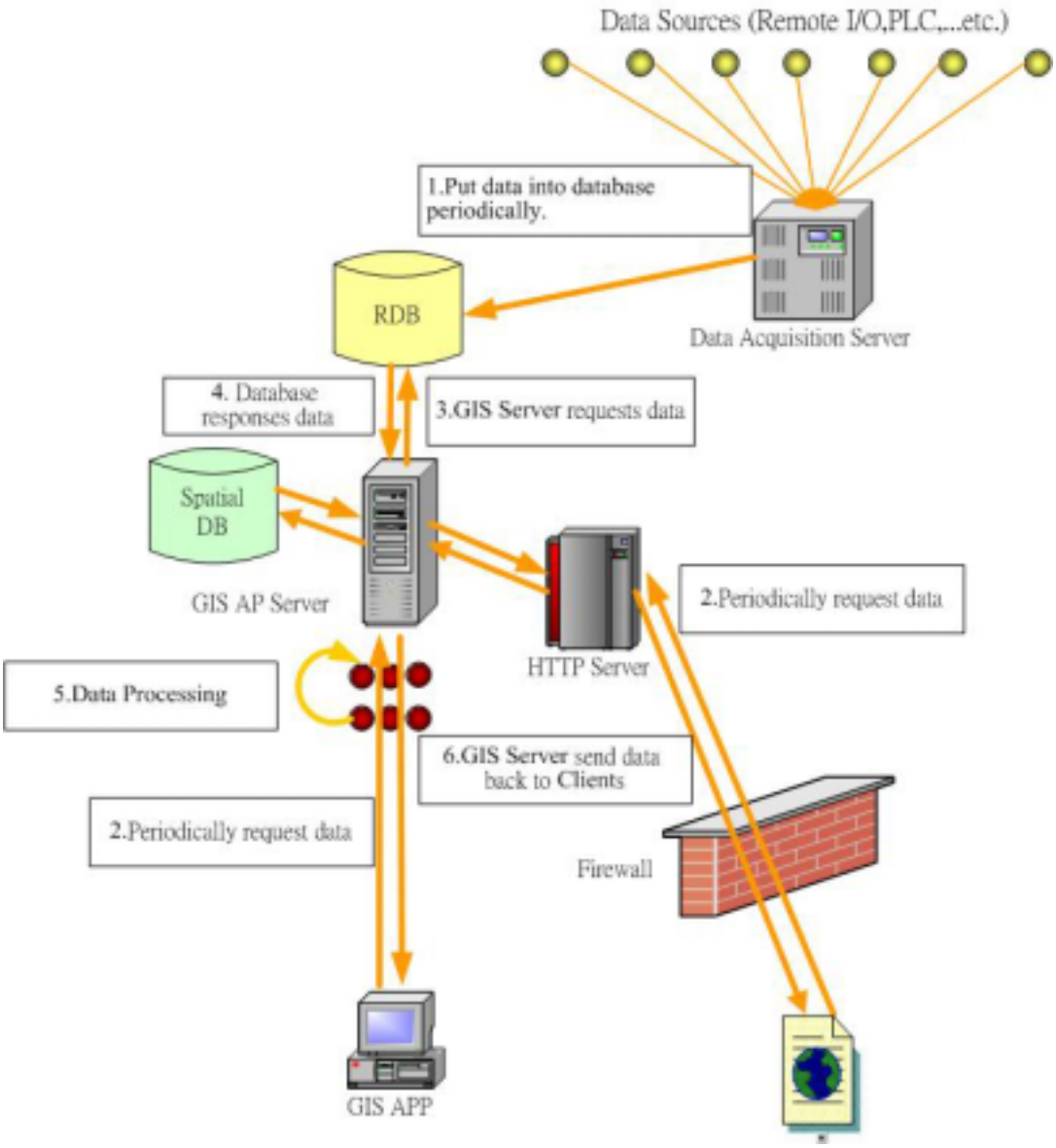

Figure 2. Existing practice #1

- Client Side (existing practice #2)
  - Client AP may reach the database for the latest positioning figure
  - Database would transmit the requested figure to client AP
  - Client side AP may calculate and display through Tracking Layer

Defects

1. Meet the needs for historical statistics and analysis. Not suitable for real-time reaction applications.
2. GIS server and database server. Not suitable for handheld GIS. The hardware would limit the range of application.

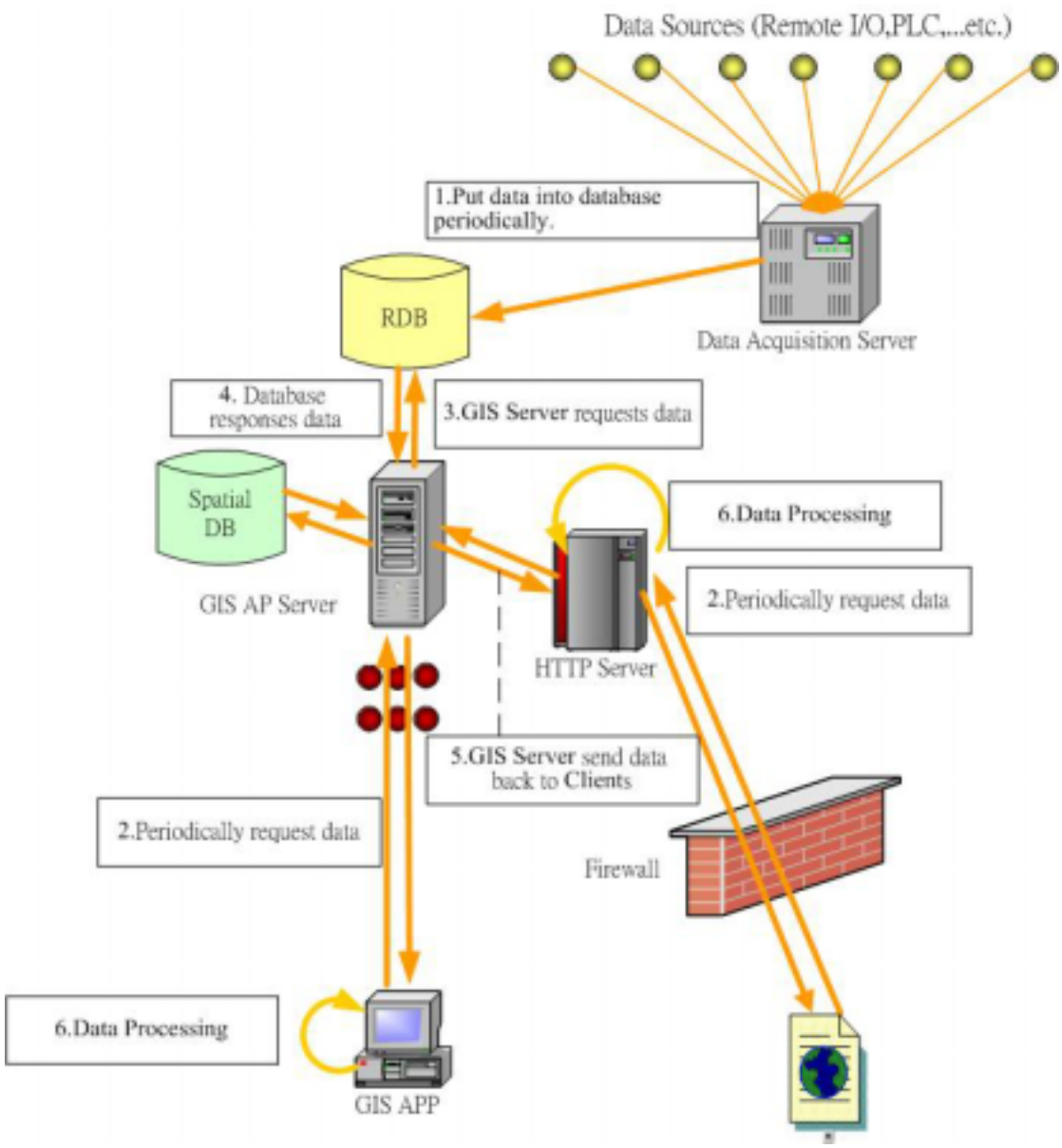

Figure 3. Existing practice #2

2. The Practice with iPush® Server

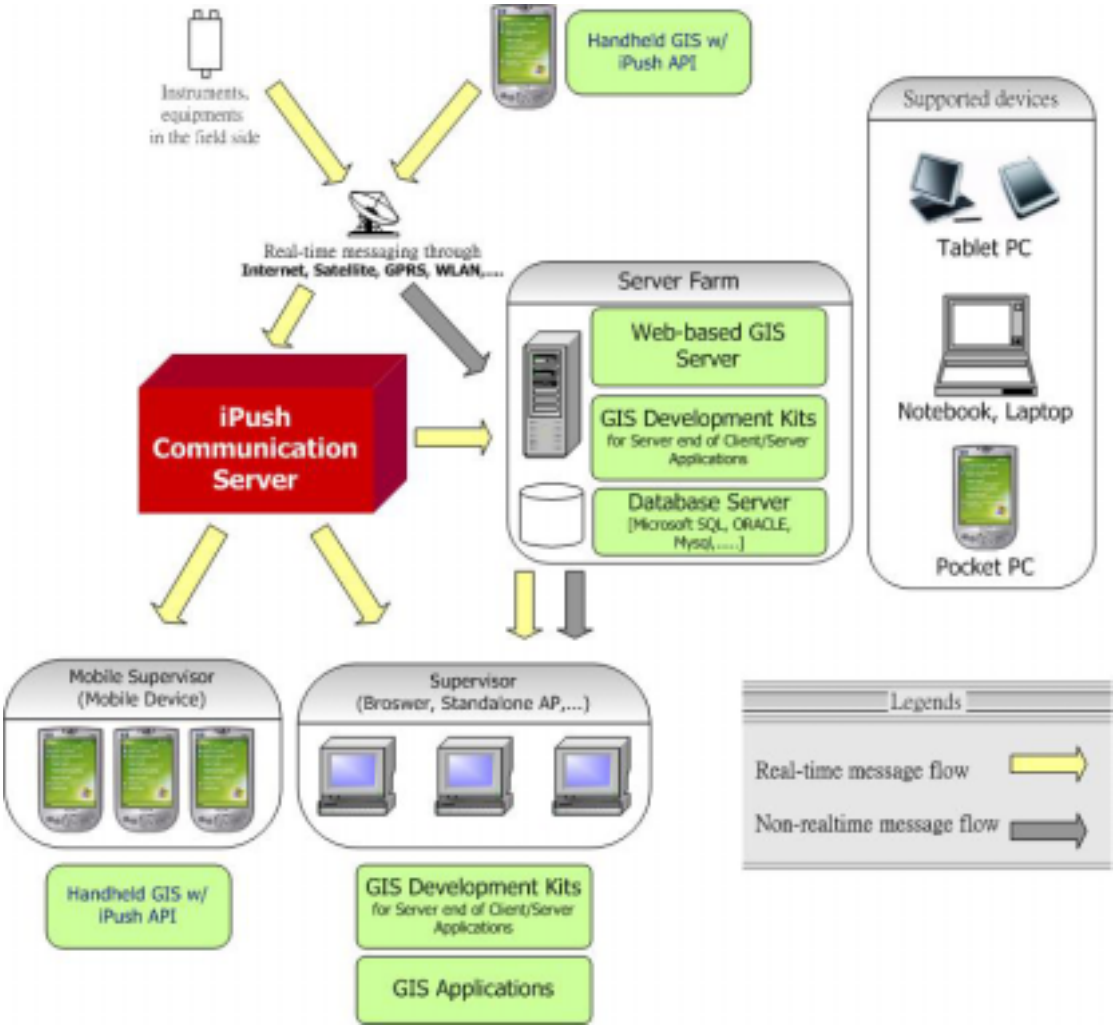

Figure 4. GIS powered by iPush® Server

At present stage there are three ways for GIS Server adapting to iPush® Server:

❖ Practice A. (for Web GIS)

- The field equipment (data sender) with iPush® API and GPS function would send positioning and measurement figure to iPush® Server through wired or wireless communication.
- iPush® Server would actively publish real-time positioning and measurement figure to data receiver (client AP). In the mean time, iPush® Server would send a copy into database.
- Client AP may calculate and display through Tracking Layer.

Benefits

1. Lighten the loading of GIS server and database.
2. To increase con-current connection service capacity.
3. Shorter system response time.
4. Less dependency on bandwidth.

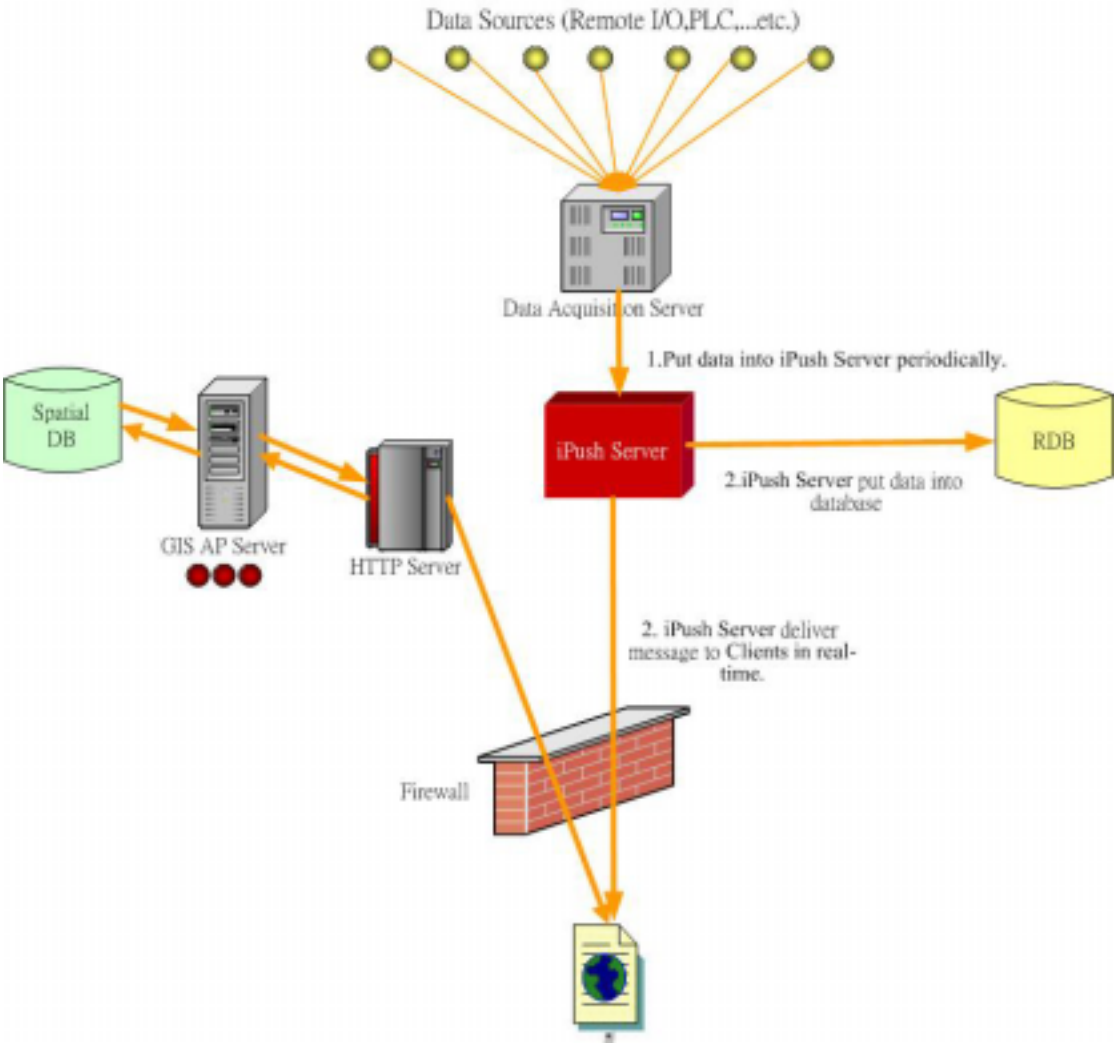

Figure 5. Web GIS powered by iPush® Server

❖ Practice B. (for Desktop GIS AP)

- The field equipment (data sender) with iPush® API and GPS function would send positioning and measurement figure to iPush® Server through wired or wireless communication.

- iPush® Server would actively publish real-time positioning and measurement figure to data receiver (client AP). In the mean time, iPush® Server would send a copy into database
- Client AP may calculate and display through Tracking Layer

Benefits

1. Easier the developing effort by transparently using iPush® API in GIS application development tool.
2. Lighten the loading of GIS server and database.
3. To increase con-current connection service capacity.
4. Shorter system response time.
5. Less dependency on bandwidth.

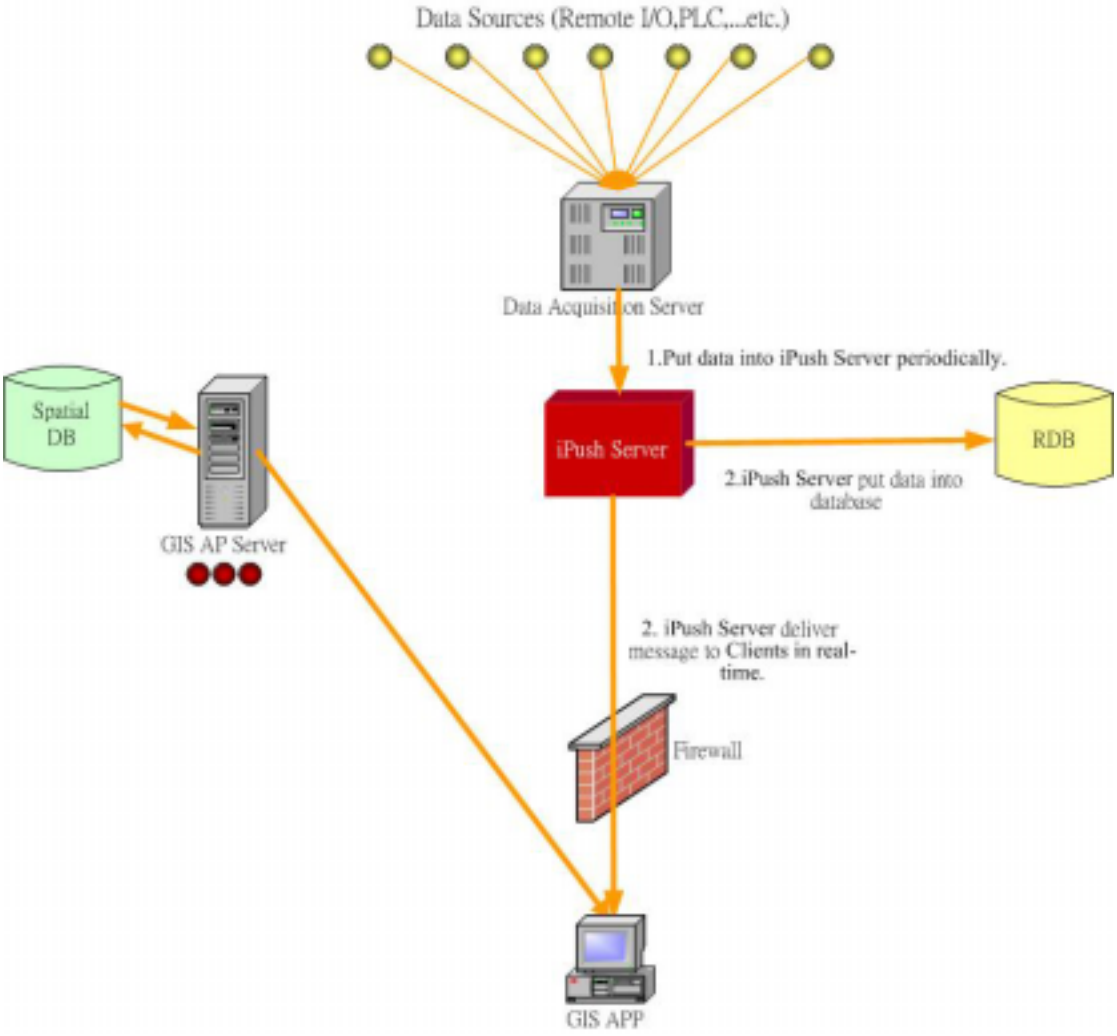

Figure 6. Desktop GIS AP powered by iPush® Server

❖ Practice 3. (for Handheld Devices)

- The Handheld GIS (such as ArcPad), GPS and handheld devices with iPush® API would send positioning and measurement figure to iPush® Server through WAN, GPRS, CDMA or other wireless communication
- iPush® Server would publish real-time positioning and measurement figure to “Subscriber”. In the mean time, iPush® Server would send a copy into database
- Client AP may calculate and display through Tracking Layer
- Pre-programmed script may call iPush® API to receive real-time data from iPush® Server. The integration with Handheld GIS would display the result of geographic information and real-time data

Benefits

1. Suitable for Pocket PC or car PC for field investigation
2. Lighten the loading of GIS server and database
3. To increase con-current connection service capacity
4. Shorter system response time
5. Less dependency on bandwidth

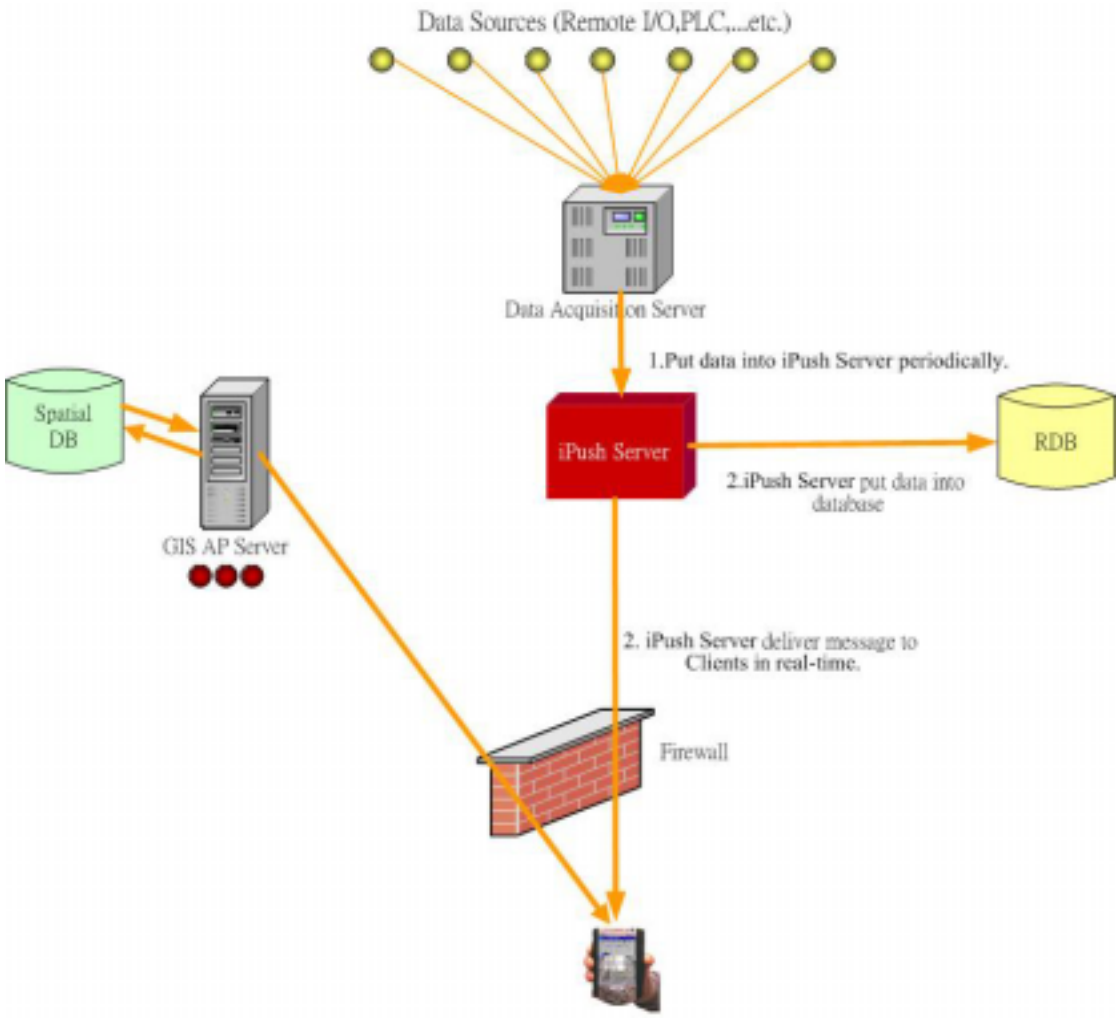

Figure 7. Handheld GIS powered by iPush® Server

About ICE Technology Corporation

ICE Technology Corp. was established in April, 2000. It is the 1st software company in Asia to develop MOM (message-oriented middleware) as core business. Aggressively market product internationally, vowed to be: "The World-class Business Communication Software Provider". Current products have been deployed and integrated by world class enterprises, Future Exchange, financial service institutions, online game design company, military agency, environmental bureau and agency, weather bureau and agency, water resources bureau and agency, academic agency, and IT technology vendor.

ICE Technology offers high efficiency, stability, and secure communication software solution. Years of service experiences can help GIS solution providers rapidly integrate advance data transportation technology into current products.

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