



ICE iPush[®] Communication Server V2

Successful Story Series

Taiwan Tobacco & Liquid Corporation

Real-time Enterprise Information Exchange Center



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Prefix - Successful story series

Since 2000, real-time information delivery solutions from various industries have been built on top of ICE iPush[®] Communication Server (iPush[®] Server). As time goes by, these iPush[®]-based applications help enterprises evolved to real-time operation through IP network. iPush[®] Server was also deployed in industrial controlling sector where IT adoption falls behind in enterprise information systems. Hence, dream of real-time, remote, multi-point field-to-center data acquisition had come true by standing on iPush[®] Family's shoulder.

In this successful story, Taiwan Tobacco & Liquid Corporation (TTL) applied iPush[®] Server V2 to build a real-time enterprise information exchange center. Freshly draw another aspect of information integration outside of EAI. By not changing over 150 branches' applications and users' behavior to develop a valuable data warehousing system with data feed in real-time fashion.

This is a great opportunity to have close look on how enterprises today expand management depth and width. We wish you enjoy this cases study.



Product offering

iPush[®] Server Family

- ❖ **iPush[®] Server V2:** A massive connection message-oriented middleware, the base of real-time enterprise information exchange center. Usually deployed on central site to provide publish/subscribe and point-to-point message delivery models. Resulting best-of-breed real-time, multi-point data exchange services.

- ❖ **iPush[®] V2 ActiveX API:** TLL MIS specialists used VB development tool with iPush[®] V2 ActiveX API to develop applications of Client Agent, Data Warehousing Agent, and Broadcasting Agent.



Client Profile - Taiwan Tobacco & Liquid Corporation

The monopoly business was started in Taiwan during the time of the Japanese occupation. In 1947, 1951, and 1968, the Taiwan Provincial Government reorganized the Taiwan Tobacco and Wine Board. In 1999, it became a private enterprise, the Taiwan Tobacco & Liquid Corporation.

The Taiwan Tobacco and Wine Board was an agency which handled the production, delivery, and sales of tobacco and liquor. It was responsible for the mass production of sufficient tobacco and liquor to satisfy public demand, and the implementation of the tobacco and liquor Monopoly Regulations. The agencies under its jurisdiction, such as the tobacco and liquor distribution units and permitted retailers were spread around Taiwan and became a strong, extensive sales network. The monopoly profits from tobacco and liquor were submitted to the National Treasury, and fulfilled their economic and financial goals. The operations of the Bureau were very profitable, and the profits provided to the Treasury accounted for a large portion of the tax revenue of Taiwan.

At the end of June 1997 TTWB's total assets and stockholders' equity accumulated to US\$4,627 million and US\$3,137 million separately.

Now TTL's capital is NT\$ 35 billion (about US\$ 1.1 billion) and has about 6,000 employees. There are 4 major business units: tobacco, wine, beer, and circulation; 9 wine factories, 3 beer factories, 5 tobacco factories, and other periphery factories; departments like administrative, MIS, planning, financial, accounting, personnel, and etc..

In Taiwan area, there are more than 100 direct channels, about 50,000 retail merchants (year 2002). TTL is the largest tobacco and liquid vendor in Taiwan's retail market.



Client's requirements

Existed system status

TTL has been established over 100 years. Information systems have been deployed over 20 years. Each information system of production, sales, finance, and warehousing was built in different time frames with different contractors. Even sub systems in the same category are different because time of establishment and location.

Take POS system for example, each sales point (approximately 150~160 sales points) has different settlement hour, tax, and discount issues. This reflects different data definition and format. TTL headquarter faces daily consolidation from various data format at different business hours to conduct traditional sales report (simple **quantity X wholesale price** base). The report can't reveal actual sales numbers, not to mention applying decision making strategy to respond rapid changing market.

And when enterprise conducting data consolidation, solely rely on statistic files transportation in daily batch method. Theoretically, any decision can be made only refer to post sales information one day ago. If any more manual data auditing and adjustment occurred, valuable time for decision making is past away.

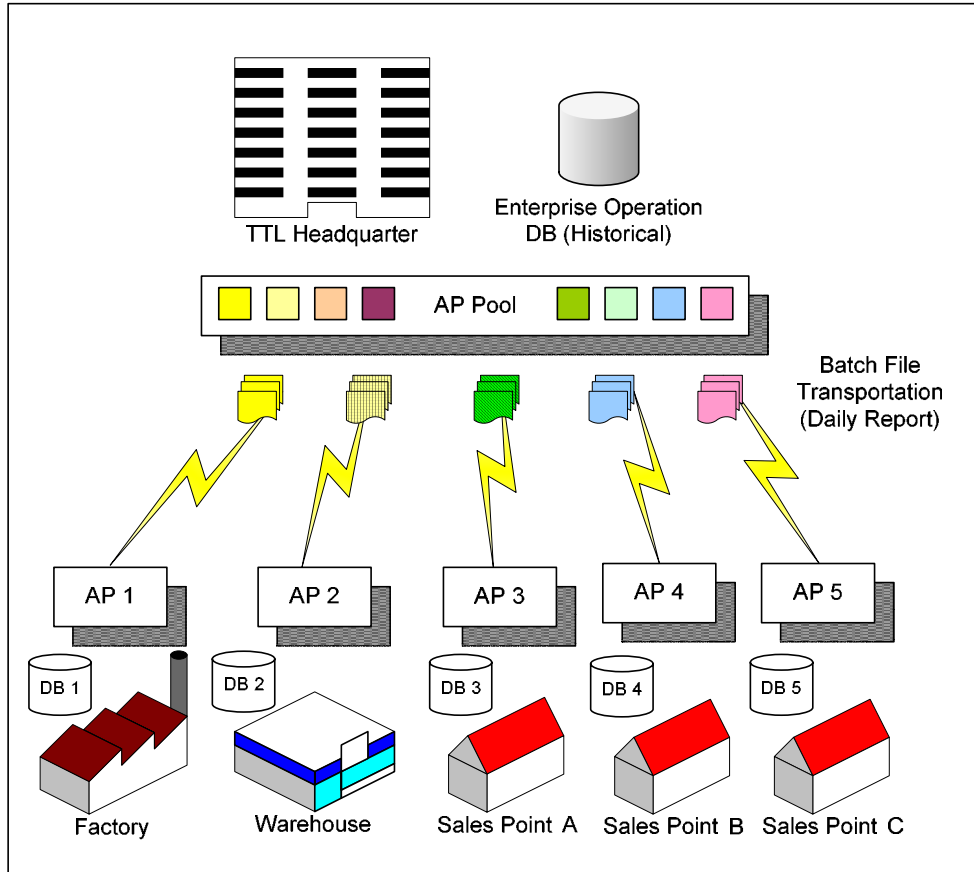


Figure I. Existed architecture: each point batch transports daily report to headquarter DB.

The existed architecture faces problems as below:

1. Each point transfers daily report to headquarter in different time frame. Difficult to reflect operation status, not easy to develop online analytical processing and business intelligence systems. Keep enterprise operation DB for historical storage only.
2. Heterogeneous applications and DBs at sales points. It will cost a great deal of effort to maintain and upgrade.
3. Data format is not unified on definition, increase difficulty in automatic exchange.
4. Highly rely on manual handling, increase contrived errors.
5. Difficult to audit data alteration, make problem solving hard to clarify responsibility.
6. Difficult to establish applications for bi-directional information exchange

between headquarter and points.

7. Difficult to reform operation processes.

Requirements description

Base on TTL's plan, each information system including sales data, stock data, material adjustment data, financial data and etc. must be integrated into the new system. Scope of this integration is not less than reengineering for any ERP adoption, but ERP system is based on destroy-all-then-rebuild matter with long term period. All current operation processes must be reviewed and reassembled. The internal interferences and cost of ERP are not likely bare by TTL. It will involve numerous heterogeneous systems and 150~160 deployment points.

To avoid making huge risks and efforts on maintenance and upgrade for heterogeneous systems and applications, TTL focuses on fundamental information accuracy and real-time information exchange rather than involving general EAI. The key actions are:

- ❖ **Redefine data structure**
- ❖ **Increase data exchange efficiency**

Then TTL can gradually support data warehousing, OLAP, and business intelligence systems development. Make decision support system possible.

Besides reviewing internal business logic and redefining the architecture of data exchange, TTL must find an enterprise-class messaging middleware to serve real-time, massive, and multi-point information exchange in the market.

The MIS specialists of TTL hope to build a real-time information exchange center without changing any existing workflow. The goals can be summarized as below:

1. Provide real-time sales information for data warehousing. From existing post business day report to real-time basis. In order to perform OLAP and



business intelligence with precise information for decision making reference.

2. Solve existing data transportation controlling issue to ensure data integrity.
3. Reduce manual data handling including duplicated data entries, data error handling, data sorting, and etc. Result in lower cost to increasing operation accuracy.
4. Enhance real-time, bi-directional interaction between headquarter and points.
5. Increase system management and overall operation efficiency.

Adopt iPush[®] Server

Architecture

After public bidding procedure, TTL chose ICE Technology's iPush[®] Server V2 as platform of enterprise information exchange center.

Entire data exchange flow and structure turn out cleaner. Efficiency surpassing exist structure by far.

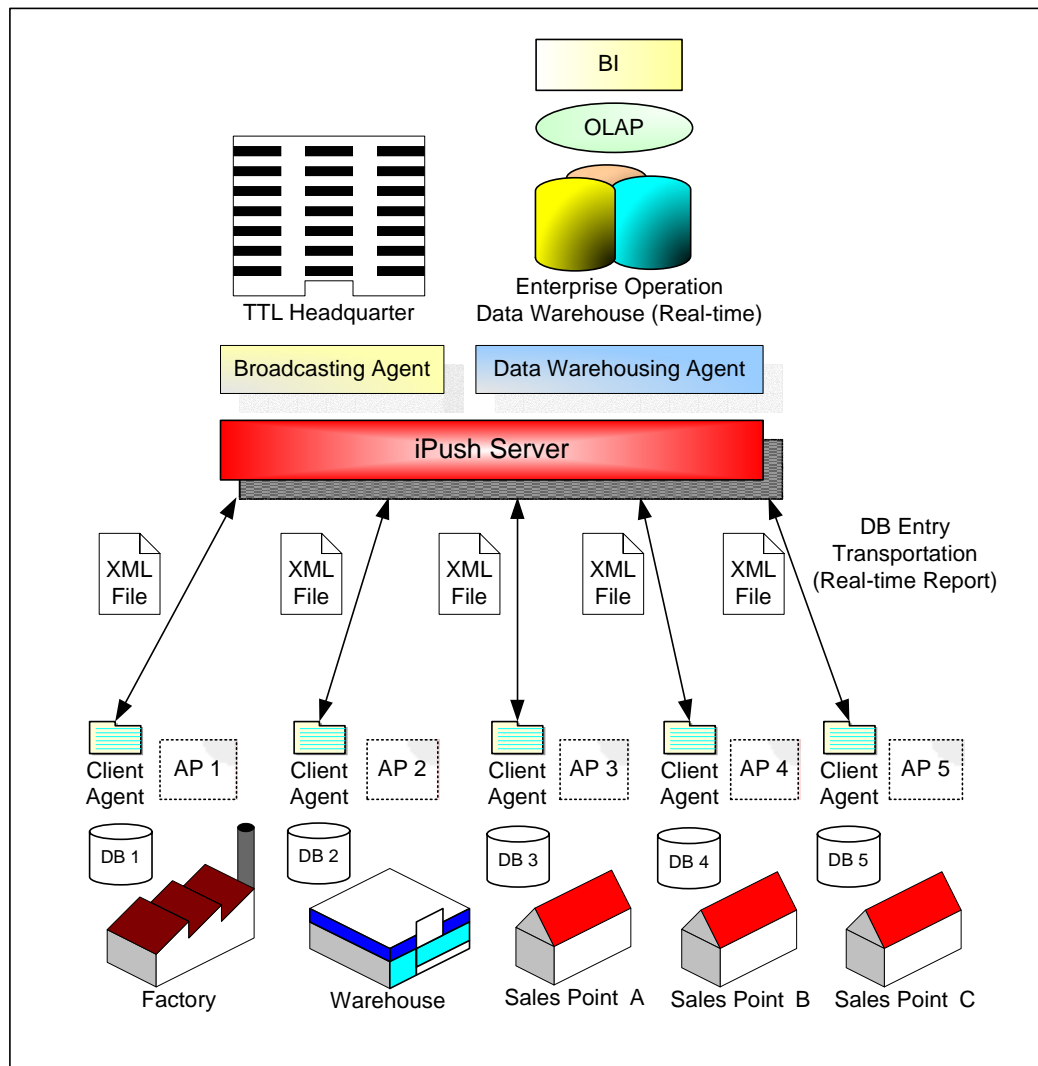


Figure II. iPush[®]-based real-time information exchange center

Actual benefits are:

1. Without interfering existing APs at each point, by replacing file transportation capability with single version Client Agent (iPush[®] Client) listen to altering on DB entry. When any change occurs, it will be automatically translated to a XML file then publish to iPush[®] Server.
2. Once iPush[®] Server receives the XML file then push the file to subscribed Data Warehousing Agent.
3. After Data Warehousing Agent receives the XML file, it will be translated to SQL commands and write to data warehouse to real-time supply OLAP and BI applications.
4. Other than above, when headquarter broadcasts data through iPush[®] Server, Client Agents will also translate the broadcasting XML file and write data to DB at each point side.

With adjustments above not only simplified structure of information exchange, they also developed an unified data definition system for better integration in the future.

Adoption flow and time frame

EAI has never been an easy task. Middleware adoption mentioned above will not solely complete overall task. During development period, TTL's MIS department has 3 main working items:

1. Review existing data format and refine XML translation format for real-time exchange.
2. Auditing data before and after exchange. This operation is tightly coupled with business logics deal with complication, longer time and will continue to do so.
3. Client Agent, Data Warehousing Agent, and Broadcasting Agent development, test and fixing.



Whole adoption period consisted in 4 months of time (Sep. 2004 ~ Dec. 2004) with 2 dedicated developers from TTL's MIS department. Half of time was spent on defining each unit's data. About 1/3 of time was used on applications development and deployment. ICE Technology provided supports on iPush[®] Server installation and application development consultancy.

After 4 months, each point successfully connects with information exchange center in headquarter. Besides few subsystems are still under DOS environment waiting to be upgraded later, most of units are online running.



Benefits of iPush[®] Server

Benefits of adopting iPush[®] Server can be classified into system level and management level.

System Level

- A. Build an enterprise-class real-time information exchange platform.
 - 1. Build a standardized real-time exchange platform, allow current unorganized heterogeneous systems has unified and bi-directional information exchange mechanism.
 - 2. Current and future application systems can be built on module base. Without tapping into complicated EAI engineering to reduce adoption effort and maintenance obstacle.

- B. Base on XML as information exchange standard to meet future expansion needs.
 - 1. Replace the lowly flexible file transportation method with XML formatted. Solve data decimal error problem and not interfere existing data format to add new data definition.
 - 2. Able to make plan of signing off and auditing workflow to solve the uncertainty due to human interference in material distribution. Ensuring data consistency in each subsystem and clear definition on inventory to manage precisely.

- C. Act as information exchange infrastructure of supply chain management to achieve unified data warehouse system.
 - 1. Group distributed data from each point to headquarter data warehouse to make audit easier.
 - 2. Avoid possible data damaging due to violate SOP.



Management Level

- A. Provide accurate and real-time data source for OLAP and BI systems.
 - 1. Provide real-time commerce information. Upgrade from post daily report gap to anytime base.
 - 2. Compare contents between data warehouse in headquarter and database in each point to verify and recover the abnormal section. Solve data inaccuracy issue.
 - 3. Automatically audit all points on error entries and notify related personnel. Reduce cost of data correction and coordination.
 - 4. Because of internet-based audit system, management can be easily performed remotely anywhere.

- B. Enhance the digital relationship between headquarter and each point to meet bi-directional real-time interaction.
 - 1. Shorten preparation time before shipping out.
 - 2. More accurate and fast auditing.
 - 3. Through information exchange center to get rid of unreasonable procedures.
 - 4. Data accuracy to shorten service time frame.
 - 5. Base on above enhancement to increase satisfaction among supply chain and sales channel to better TTL's market competence.

- C. To have the least impact on organizational culture, workflow, and successfully build the enterprise digital nerve system.
 - 1. Each subsystem application remains the same, only Client Agent listen to DB table not affect existing application performance.
 - 2. Client Agent works on background, onsite managerial staffs still work with unchanged workflow and operation behavior. But finds less data request and data inaccurate complains from headquarter.
 - 3. After adoption, many hidden unreasonable phenomena have each surfaced. Making reform effort very supportive by the numbers.



Testimonial

"We are conducting silent revolution in this over 100 years old corporation. Using iPush® Server to build the enterprise information exchange center is the greatest milestone in this silent revolution."

"Under not change operating applications policy, general EAI is hard to set into action. Using iPush® Server to build the enterprise information exchange center is a wise choice."

"After we deploy iPush® Server for stable information exchange infrastructure. We now must face standardization of data format and major reconstruction engineering. Time is never enough."

~ F. M. Lee, EAI Project Leader, MIS Department, TTL



Sectors similar to apply with this successful story

The architecture of this successful story can be applied to system integration below:

- ❖ Multi-point, cross databases bi-directional network information exchange.
- ❖ From batch to real-time processing.
- ❖ Not changing AP and user behavior to redefine data exchange structure and adopt XML application.
- ❖ Multi-point information broadcasting through IP network.

For example:

▶ Logistic, retail and chain stores

Focusing on real-time information exchange between multiple sales of points.

▶ Manufacturing and public utility business

Focusing on real-time processing of materials purchase, risk management, energy supply management, pipeline management, device monitoring, and etc..

▶ Financial service industry

Focusing on financial holding company, bank, and insurance with headquarter and branches.

▶ Government agency

Focusing on data tracking and forensic to enhance administration efficiency, information support for decision making, and other heterogeneous system integration.



About ICE Technology Corp.

ICE Technology is a software company specialized in the development of massive connection MOM (Message-oriented Middleware). Now, ICE Technology is actively promoting the MOM products into global market. The vision of the company is to become 'The World-class Business Communication Software Provider'. There are many world class enterprises adopting or bundling ICE MOM products with their products, services, and solutions, including government and defense division, Taiwan Futures Exchange, financial service enterprises, on-line game design house and profession information technology companies.

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