Japan Meteorological Agency

Customer Success

ADESS (Automated Data Editing and Switching System for meteorological information). New mission critical system for weather observation and forecasts across Japan was built in just eighteen months

Mission critical system, responsible for weather observation data exchange, weather forecasting and warnings was built in only one and a half years

Industry	• Government agency
Hardware	• PRIMEPOWER Unix servers, PRIMERGY PC servers and ETERNUS6000/3000 storage systems
Software	• Interstage integration products, Systemwalker integrated operation management software, Symfoware high reliability database and PRIMECLUSTER high reliability platform software

"If Fujitsu doesn't fully understand what we want in this new system, this project won't succeed. Superficial understand will never work." (Japan Meteorological Agency)

JMA (Japan Meteorological Agency), known by its weather forecasting services, provides weather information, warnings and advisories of tsunami and volcanic activity. Such activities are based on weather data collected from hundreds of observatories across Japan. From that data ADESS collects edits and distributes weather forecasts figures and weather observation data, transformed to a simpler format for specific destinations based on numerical predictions created by supercomputers. ADESS is a system which must never stop. The mission critical system was established jointly by JMA and Fujitsu during an 18 month construction period.

[This is a translated article from a success story posted in Japan.]

FUJITSU

THE POSSIBILITIES ARE INFINITE

Japan Meteorological Agency

Customer Success

Problems and effects

Private lines costs were too high. Network length was limited due to network charging being proportional to distance. Former systems were decentralized, however overall system efficiency was deficient.

➡ **Network costs shrank due to the advent and choice of "distance-free" networking services. The resulting centric system improved system utilization.**

Improved weather forecasts accuracy is accompanied by data volume increases. As a result, system performance had reached its limit.

➡ **Whole system performance was improved by installation of higher performance servers, wider bandwidth networks, large capacity storage and optimal middleware. System renewal brought about these systems performance enhancements.**

Based on legacy technology the system made it difficult to expand business using IT technology

➡ **Hardware and software system flexibility was improved by the choice of open system architecture. New middleware with a more extensible development environment gave JMA the power to prepare for new business operations.**

System background

Improved network environment empowered system consolidation of the previous distributed system

ADESS has two roles. First is its telecommunications function. These are used to gathering and process weather observation data inside and outside Japan and then distribute that information to subordinate departments and related organizations. ADESS is linked to a global network of meteorological organizations through the WMO (World Meteorological Organization) under the control of the United Nations, as well as to Japan airports and Japan meteorological observatories/weather stations. Japan Meteorological Agency acts as a crucial weather information hub in Asia.
Its second role is as a data provider issuing graphical and tabular output based on numerical weather prediction data created by their super computer. This enables weather forecasting services to report the weather in plain language.

The former system was built in distributed style with one central system at JMA headquarters, subordinate systems at district observatories and PCs at local offices. When the former system commenced, distance-based private network fees clearly cost too much. A distributed style of system was selected to shrink such expensive network fees.

As weather forecasting accuracy evolved, weather observation data volumes grew causing the former system to reach its performance limits. Moreover, with the former system design based on legacy technology, it was difficult to enhance with new technology. Finally maintenance services for the former system became unavailable making system reconstruction an urgent task.

FUJITSU

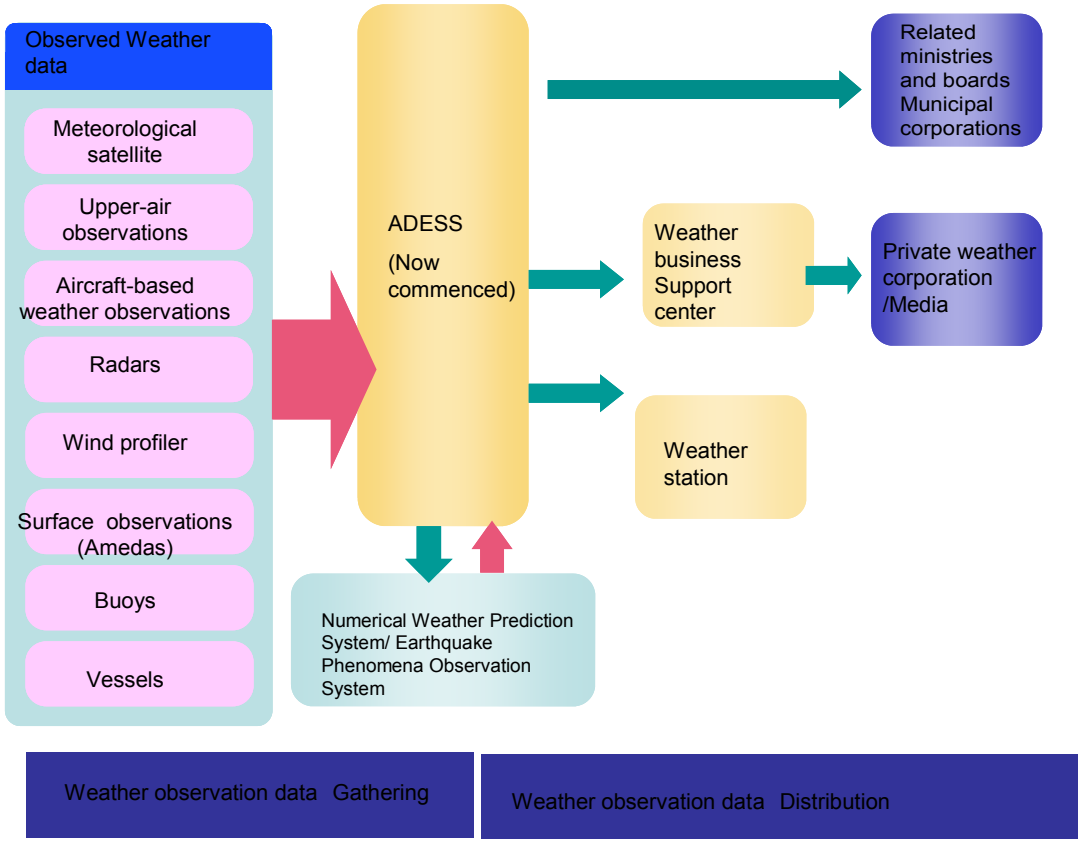
THE POSSIBILITIES ARE INFINITE

JMA raised three policies for this system rebuild. The first was that system performance and the restructure use new information and network technology. Unlimited distance tolling for new network services made it possible to plan a system consolidation with wider bandwidth networking and network charge reductions.

The second policy was enhanced system performance and stability without overall system cost increases. The ADESS system rebuild was positioned as the first MLIT(*1) action program for legacy system restructuring in the electronic government rebuilding grand plan. So expected benefits not only included business efficiency and restructuring, but also major cost reductions.

(*1) MLIT: Ministry of Land Infrastructure and Transport
JMA is a subordinate organization of MLIT

The third policy was weather service improvement, with swift and sure weather information provision. The system rebuild policy included network reliability, scalability and system construction using open platforms.



Japan Meteorological Agency

Customer Success

Key points of system introduction

Over 200 design reviews and studies led to a short-system delivery period

ADESS, which was positioned as the most important project in JMA, was prepared very carefully. The project started in the spring of 2001, with relevant procurement procedures starting at the end of that year. The project budget was passed in fiscal year 2004 and bid announcement was made at the beginning of 2004. The careful preparation over two years continued favorably. But even after completion of detailed specifications, content changes continued, reflecting changes of weather warning/advisory conditions, new services and new data formats.

Fujitsu was chosen from an international competitive bidding process because its proposal included life-cycle cost reductions including maintenance expenses.

The whole JMA organization jointly pushed this project forward. Workgroups organized by responsibility created specifications. The number of workgroups (telecommunication/hardware/networking/terminals) reached a peak of around 30. At the combined project meeting held just after the deal was closed, JMA addressed the attitude required for coordinated project success. “If Fujitsu doesn’t fully understand what we want in this new system, this project won’t succeed. Superficial understanding will never work.” All project members including JMA and Fujitsu came to share such understanding. Each time a specification was updated by JMA members, review meetings were held. JMA and Fujitsu came to acquire a deep mutual understanding through specification explanations, questions from Fujitsu and responses from JMA and clarification on what was to be done. Over 200 such review and study meetings were held. The results of such elaborate interworking and deep mutual understanding led to successful implementation of this big project in just eighteen months.

A clear decision standard was placed on problems such as workgroup project delays, related schedule adjustments and longtime stayed action items. “They were classified into three categories: “Must Do”, “Should Do” “Nice to Have”. Lowest priority was placed on “Nice to Have” items and highest priority on the “Must Do” items for the businesses. For instance, tsunami information service, and similar issues were handled at the highest priority among earthquake items. Although the decision standard was clear, it was a a serious tasks to place priority on each item. However such clear standards in priority setting resulted in smooth project handling.

System Overview

Reliable hardware, middleware and responsibility built the mission critical system

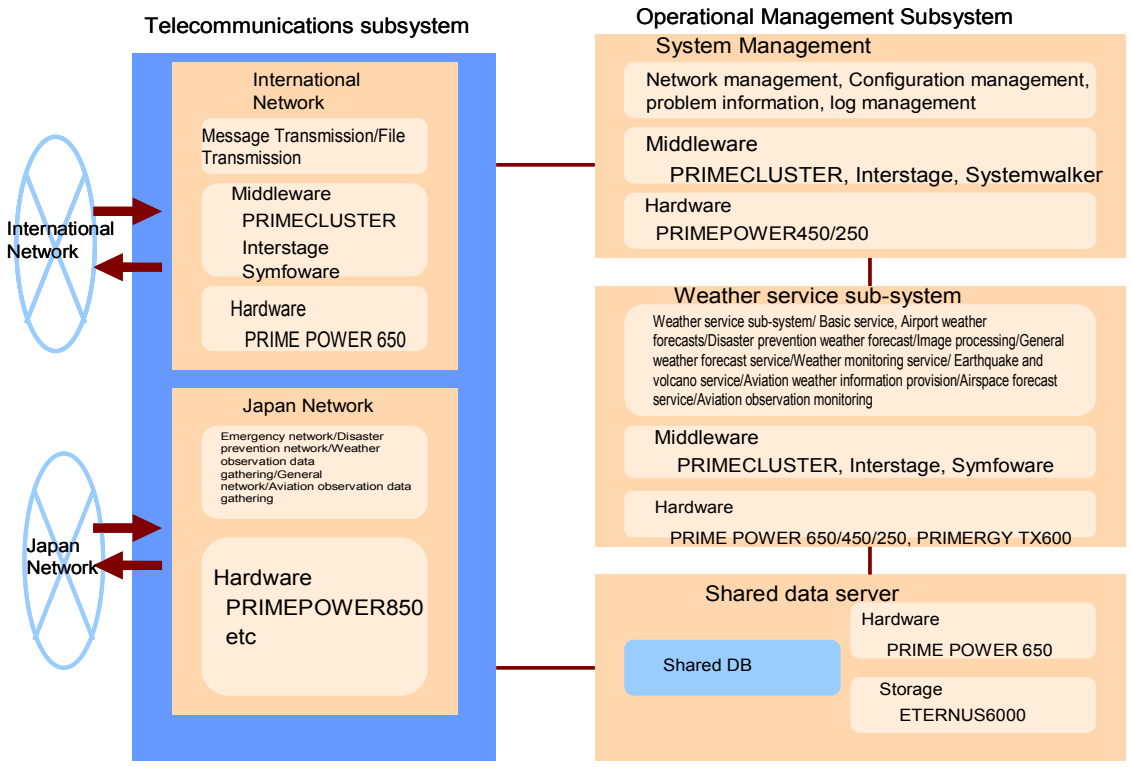
ADESS is the most crucial weather service system JMA provides, so it must never stop. This required durability, reliability and availability. Fujitsu servers including PRIMEPOWER, UNIX servers, PRIMERGY IA servers and ETERNUS storage systems were selected as the platforms for this new system. In addition, Fujitsu middleware including PRIMECLUSTER, Symfoware and Systemwalker, further strengthened the three system requirements.

PRIMECLUSTER, in a high-reliable cluster configuration, provides stable fail-over operation. Symfoware, as a highly-reliable database, provides stable operation, efficient processor power consumption and manages weather data transmission records. This combination of PRIMECLUSTER and Symfoware also prevents data loss that might occur at time of fail-over.

Systemwalker, monitoring over 60 servers and network devices, enables swift problem handling. Interstage, used in application development/deployment continues to provide a scalable development environment and application integration.

The JMA system, so fundamental to the protection of citizens from disasters, uses high-level fault-tolerant functions so that, without exception, the system never stops. All system components including servers, storage and networks are built with dual configuration. Moreover different functional sub-systems are split over different hardware devices so that failure of one sub-system doesn’t lead to an entire system failure. For instance, networking functions for international organizations and for Japan organizations are built on different sub-systems.

Earthquake occurrence information, which must be swiftly and continuously provided, has multiple transmission routes including both ground networks and satellites. In the future, the ADESS system will have fully dual sub-systems including the current EAST ADESS and a WEST ADESS in order to counteract system failure. In the event of a disaster on one sub-system, the other sub-system will provide complementary operations. Although WEST ADESS is still to be build, it is expected to be almost the same system as the current EAST ADESS.



Future perspectives

All services are being consolidated onto ADESS

As stated above, the ADESS rebuild project was positioned as the first MLIT action program for legacy system restructuring in the electronic government rebuilding grand plan. This project fulfilled the targets of this program, with operational expense reductions and disaster prevention weather service improvement with more refined weather information provided by doubling the weather service areas.

EAST ADESS, which started operation in October 2005, was evaluated as providing expected results.

JMA will continue to use their current software, develop their systems and consolidate their various needs and new services, as much as possible, into the current system.

The JMA project leader talked about Fujitsu's work on the project.
"This project was the first joint project with Fujitsu, so we were concerned whether Fujitsu knew the meteorology business well enough. However, such concerns were resolved and a solid system was build by the due date"

Fujitsu continues to support ADESS development with full backup organization and cutting-edge technology.

Japan Meteorological Agency

Customer Success

Profile of Japan Meteorological Agency

Address	1-3-4 Otemachi, Chiyoda-ku, Tokyo 100-8122, Japan
Director General	Dr. Tetsu Hiraki
Establishment	June 1st, 1875 (Tokyo Meteorological Observatory, predecessor of JMA, established)
Activities	Monitoring of natural phenomena, weather, earthquakes, tsunami and volcanos. Provision of this information to related ministries and boards, municipal authorities and the media. Mitigation and prevention of natural disasters, safety of transportation, development and prosperity of industries, improvement of public welfare and environment protection achievements through the above activities
URL	JMA homepage