SupportLine – know-how logistics for the Y2K rollover and beyond

As a supplier of automation products and systems as well as complete industrial plants, ABB is working with users to ensure that the equipment and facilities are Y2K ready. Following up on its core Y2K programme, which focuses on investigation, preparing inventories, pilot projects and training, ABB has installed a support network for customers who require support during the rollover to the year 2000. Solutions are based on ABB know-how logistics, including an ABB SolutionsBank database in which the experience accumulated during Y2K remediation work is stored.

ABB supplies industry with a wide range of automation equipment, including open control systems (OCS), quality control systems (QCS), drive products and systems, specialized control devices, instruments and analytical measuring devices. The facilities in which they are installed cover the full industrial spectrum, ranging from power stations through substations and network control centers to steel mills, paper mills, chemical plants, cement plants, building complexes, ships, oil platforms and pipelines.

Automation installations are a key economic factor in industrial plant operation, and even a slight reduction in functionality can have severe consequences. Any loss of functionality therefore has to be kept to an absolute minimum and plant performance must be restored to its previous level as fast as possible.

Over the past year or so, a huge amount of work has been done at ABB to determine the Y2K susceptibility of all of its software-based products and systems. As part of its Y2K programme, the company has developed solutions where necessary, and tested systems and plants in every kind of industry and organization. Based on this work, confidence is growing that a smooth Y2K rollover can be achieved.

However, uncertainties remain due to the potential scale of the problem and the absence of any comparable event which could serve as a benchmark. Another cause for concern is the limited time available for collecting and evaluating data provided by the tests and related Y2K work. ABB has identified areas in which there might be a need for support (see 'fishbone diagram' on next page).

The Y2K transition will be a unique event and has to be managed professionally. Preparing for potential problems which could elude the test and remediation programme is an important part of this work. In order to develop a strategy of 'defence in depth', it is assumed that a certain number of Y2K problems will occur during the critical phases. As with all computer problems, the key issue is how soon experts can be contacted who have the specific know-how required to understand and fix problems as soon as they occur. This is decisive whether a problem constitutes a minor nuisance which can be fixed quickly and will have no further impact or whether it drags on and risks becoming more severe, possibly cascading with the effects of other bugs and creating a major risk for a bigger system.

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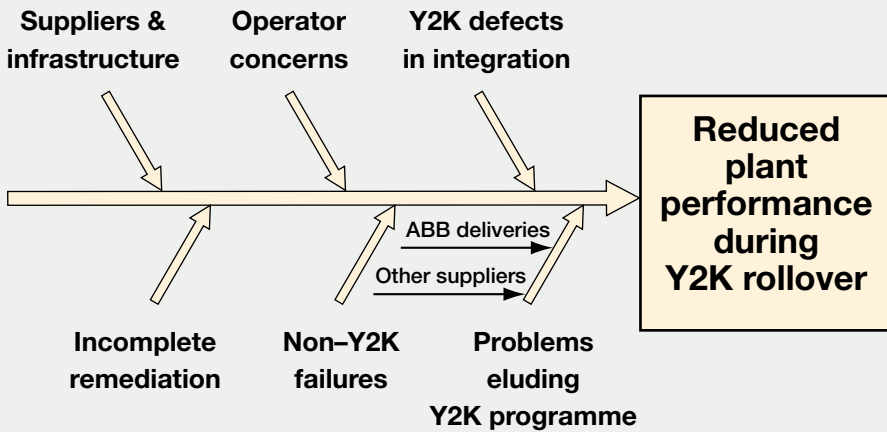ABB Year 2000 Task Force

ABB SupportLine process

ABB SupportLine Centers will provide technical support around the clock for users of OCS, QCS, drives and other ABB products. The type of support provided can be tailored to suit the customer. Some common features are:

- *Fast response:* Callers typically will be able to speak to a specialist within 30 minutes.
- *Rapid, managed escalation:* Urgent problems which cannot be solved at one level are passed to the next level of expertise, typically within two hours. At the top level the designer of the product, system or plant, is the final authority on problems involving the design.
- *Defined know-how network:* The key to rapid problem-solving is the definition of who should be assigned to solving a given problem and how the designated person(s) should be put to work on it.
- *Follow-up:* Problems and their solutions are analyzed in order to develop preventive measures and improve products. Feedback from users is a driving force behind continuous process improvement.

To achieve the desired results, a structure was devised with four levels of support and

Y2K: Causes of Rollover Problems

Suppliers & infrastructure

Operator concerns

Y2K defects in integration

ABB deliveries

Other suppliers

Reduced plant performance during Y2K rollover

Incomplete remediation

Non–Y2K failures

Problems eluding Y2K programme

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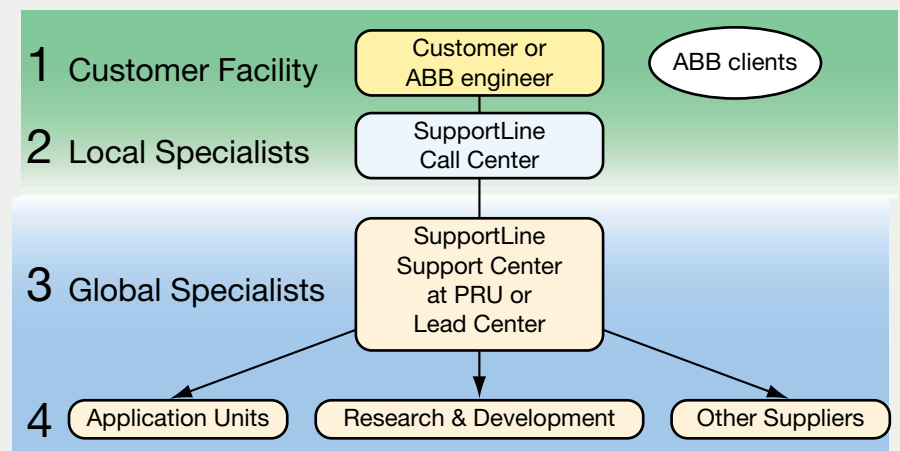a global specialist will usually be able to solve the problem quickly.

Recruitment and training of the support personnel is obviously a key factor in call center performance. ABB therefore gives a high priority to this part of the programme. Three main criteria are paramount:

- Support specialists are a cross section of highly qualified personnel taken from field service, commissioning and system/product development.

- Each specialist has an average of 10 years' experience working with ABB products, systems or plants.

- All the staff receive extensive in-house and outside training in ABB technologies, ABB offerings and communication skills.

If the problem still cannot be solved it is passed to the designer responsible for the product, system, plant or custom project, who then takes charge as ABB's final authority. The solution at this level can involve the original design as well as changes to the software or hardware. Often, the designer will specify an interim solution that

a network of engineers responsible for the know-how at each level. The organization functions as follows:

A customer or ABB employee in the customer's plant faced with a problem he is unable to solve himself calls a special number which is manned around the clock. The call is registered and the key data are logged, after which the problem is passed on according to pre-defined procedures to local specialists who are familiar with the installation. The level of technical expertise depends in each case on the type of product, system or plant involved. In most cases, the specialist in the local Support-Line Center will be able to solve the problem over the telephone. If he cannot, it may be necessary to set up a modem link to the installation, dispatch an ABB engineer or arrange for a replacement part to be sent.

If the local specialist is unable to solve the problem within the allotted time, the case is passed to the global SupportLine Center responsible for the installed plant, industry application, system, product or pro-

ject (eg, in the case of custom installations and plants). This center is linked to the ABB Product Responsible Unit (PRU), Lead Center or Center of Competence with world-wide responsibility for the installation. Here,

Y2K: Technical Support

Problem Solution

1 Customer Facility

2 Local Specialists

3 Global Specialists

4

Customer or ABB engineer

ABB clients

SupportLine Call Center

SupportLine Support Center at PRU or Lead Center

Application Units

Research & Development

Other Suppliers

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isolates the problem and provides a 'workaround' to keep the customer's process running while a permanent solution is being developed and tested. In addition to setting up modem links, the global SupportLine Center will often replicate the problem for analysis and solution on a test bed that duplicates the customer's installation. In some cases a team of support and development engineers may assemble to focus on the problem. This ensures that the best available technical expertise works on resolving difficult issues.

The combination of focus and rapid escalation yields fast results. Customer feedback data verifies that urgent problems are resolved in an average time of 2 hours at one center. R&D or plant engineers at the PRU or Lead Center also systematically evaluate the calls with regard to type and root causes. This is a most valuable source of information for product improvement as well as of 'lessons learned' when developing new products.

The importance of the different levels varies according to the type of system. Highly complex HVDC installations, for instance, are handled at one worldwide Center of Competence. Less complex systems are handled mainly by the local service organizations.

Regular surveys of callers allow the effectiveness of the support to be gauged. Randomly selected callers are called back a day or two after their problem has been solved and asked about their overall satisfaction, the Mean Time To Resolve (MTTR), and suggestions for improving support. Pairing the survey results with the call record provides the SupportLine Center and PRU team with the information needed to understand and improve the process and products being supported.

Considering the important role automation and control plays in a plant's economic performance, the MTTR clearly has to be given a very high priority. Experience shows

Y2K: Technical Support

Average Mean Time To Resolve

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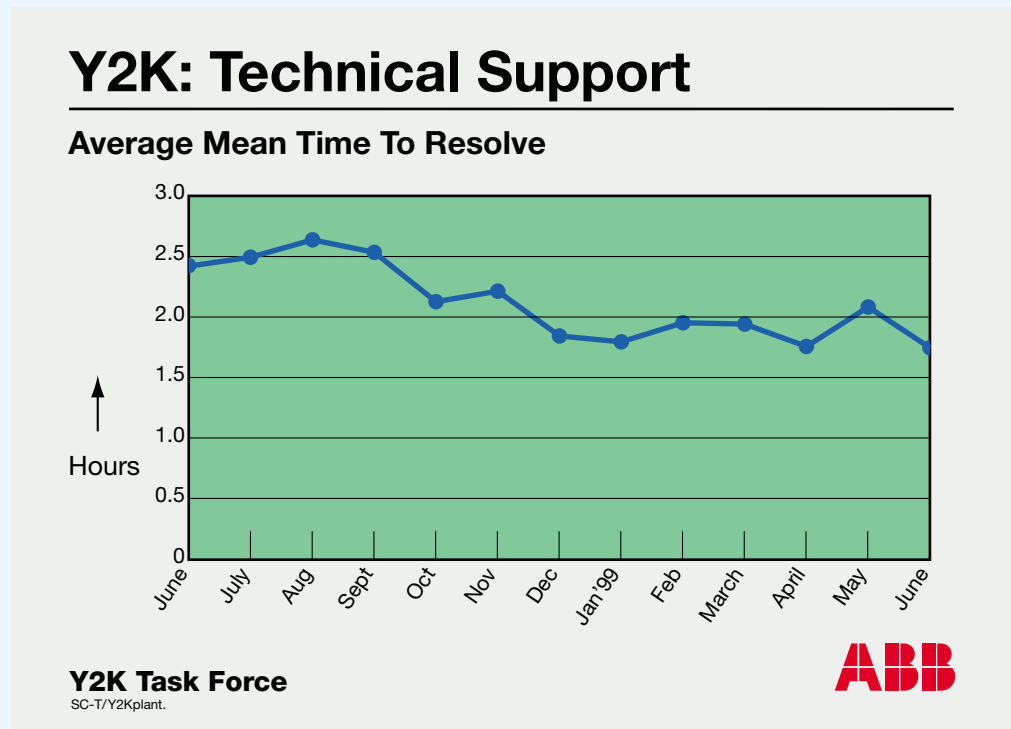
that practically all urgent problems can be solved (sometimes with an interim solution or 'workaround') within a short time. On the other hand, problems which are less urgent may require only consultation or specific information, eg, when the ladder logic does not load after reconfiguration, a station reboots itself when graphics are installed, or an operator does not know what to do when a communication interface to a PLC fails to update.

Development of 'know-how logistics' for automation systems

Ever since the introduction of digital systems, automation and IT system suppliers have been developing new ways to solve problems and prevent failures by deploying know-how to the customers' plants. This deployment can take many different forms:

- *The field engineer:* For many customers, trouble-shooting starts when the supplier's field engineer arrives at their facility. This was once the only solution and still provides a strong diagnostic resource as well as leadership in finding solutions.

- *Drawings:* These are designed for trained and experienced trouble-shooters, but can appear cryptic to others.

- *Hardware diagnostics:* Developed when designers realized that because of the complexity and reliability of their designs field engineers would face infrequent and different types of failures. Diagnostics were coupled with standardization of hardware modules to allow more efficient support and repair by replacement (plus manufacturing efficiencies).

- *Customer training:* Training in fixing automation systems and products enables some customers to play a more active role in maintaining their systems. ABB trains thousands of customers each year; however, few of them take the full series of courses and updates provided for ABB field engineers.

- *Documentation:* Trouble-shooting manuals are added to other documentation to give extra support to trained customers.

- *Telephone support:* This was another response to the increasing complexity of systems and applications. With hard-

ware issues addressed by diagnostics or by returning parts to centers for repair, the software and application have come to dominate the support time. Automation systems incorporate millions of line of code (application code is developed by local ABB units, consultants and customers), and systems from different suppliers must communicate with each other for the plant to work. The SupportLine process was developed in 1988 to assist ABB field engineers at customers' facilities. Since remote support solves 60 % to 80 % of automation problems, however, it is fast becoming the first line of support. The support specialists can dispatch a field engineer or a replacement part, if needed, to solve a problem. Remote support by telephone and modem is now the fastest-growing support process as it offers speed and accuracy, plus intelligent guidance if an engineer or part have to be dispatched.

- *Knowledge database:* A knowledge database of solutions on the Internet gives trained customers the opportunity to find

and solve a problem using an automated form of ABB expertise. Cases solved by the SupportLine are analyzed and those with a general application are validated and made available on the web with natural language search, case-based reasoning, decision trees and expert models to help customers match their problem symptoms with a known solution. ABB calls this database and its solution engine the 'ABB SolutionsBank'.

The term 'know-how logistics' describes the balance of field engineers' experience, drawings, diagnostics, documentation, training and remote support incorporated in the design of ABB automation products and systems as well as the support provided for them throughout their installed life. However, it has also been learned that remote support is a very effective way of solving customer application, process and plant problems. In the case of the latter, ABB provides support for problems with causes rooted in a customer's raw materials, processes or organization, or which involve other suppliers, besides those problems related to the

plant itself. Building on SupportLine success with pulp & paper as well as marine and cement customers, ABB and its partner, ABB ALSTOM POWER, are planning to extend this support to power plants, substations and other applications and facilities during (and after) the Y2K rollover.
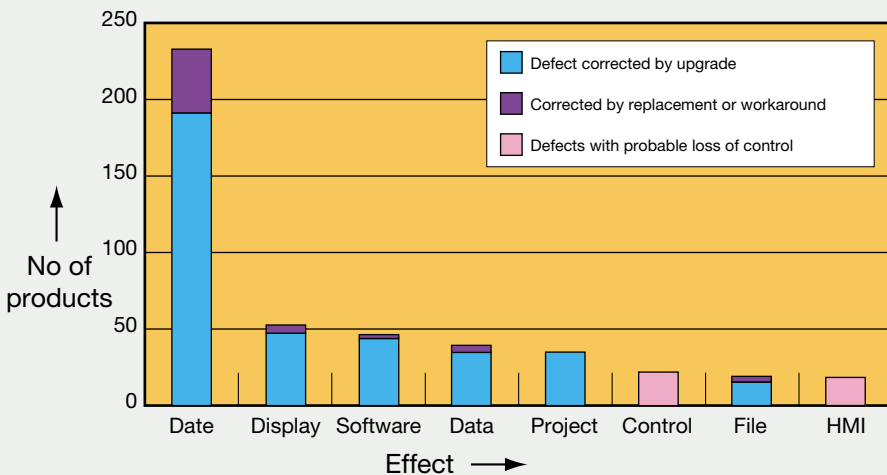
Previous results have been excellent, and more and more customers are ordering this type of support. While ABB will endeavour to support all customers in emergency situations, those with a support contract may enjoy a number of benefits:

- ABB can prepare for the support by setting up databases with the installed system data and related information (customer, caller, etc).
- ABB can ensure that specialists are available.
- Specialists get to know the customer and the plant, thereby speeding up specific, qualified support.
- ABB staff will be able to handle the expected number of calls, but at peak times priority will have to be given to contract customers and to matters involving a greater risk of injury or damage. This is very likely to be the case at some centers during the Y2K rollover.

The evaluation of SupportLine cases shows that customers signing a support contract benefit from the combination of fast remote support and the special customer-specific capability built up by the ABB field engineer during his regular visits to the customer, which usually are part of a complete service offering. This is also a key factor in the preparation of the cooperation between the customer and SupportLine specialists. Software and documentation updates, on-call response, operator training, system and process optimization, parts inventory programmes, and a number of other support features are available. ABB is therefore able in many cases to offer performance improvement targets within the scope of the service and maintenance contracts.

Y2K: Classification of Defects

Effects of Y2K defects in 313 of 5000 tested products

No of products

Defect corrected by upgrade
Corrected by replacement or workaround
Defects with probable loss of control

Date Display Software Data Project Control File HMI

Effect ➝

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Looking into the future, ABB sees a strong trend towards even higher plant performance, increased plant availability and reduced maintenance costs. Current development work on products, systems and plants supports this trend. As a result, fewer emergency situations are likely to occur. However, when they do it is critical to have very fast access to expert know-how. The need to be able to communicate fast with the appropriate expert is being met by new technologies now becoming available which will speed up know-how logistics.

An example is Computer Telephone Integration (CTI). This allows an automatic search to be made for a customer and technical data, based on the automatic identification of a calling customer via his telephone number. The call can then be routed to the available specialist with knowledge of the customer's plant. When the phone rings, the specialist's workstation displays the relevant plant, customer and caller background. In this way, modern technology allows customers to efficiently access the specific know-how needed. Another development is direct, remote access to customers' plant and system information for diagnosis and problem-solving. This vision of the future still has some way to go before it becomes reality, but its key features are already well advanced in some ABB SupportLine Centers.

Lessons learned from Y2K remediation work

It is clear that the described call and support center service is extremely valuable as back-up for a smooth Y2K rollover. Although the rollover is unique and no previous experience of such an event is available, the huge number of tests carried out in the course of remediation work provide important input data for assessing potential Y2K rollover problems.

As can be expected, the tests showed the most common effect of Y2K defects to be simply a wrong date. Other, less common effects included the corruption of historical data or displays and possible defects in customer coding. Defects that could shut down or prevent start-up of control functions or the operator interface (HMI) occurred in less than 1 % of the products. Integrated system and plant investigations and tests showed interface problems, such as the loss of time synchronization for differ-

Y2K: SolutionsBank Database

Example of entry in Y2K database

Compliance Status:	Advant Controller 70 version 1.0 will not be made compliant
Symptoms:	Wrong date in controller following start-up after 2000
Proposed Workaround:	Set date via programming tool or synchronize controller via network
Solution:	Upgrade to version 1.1/2

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Y2K: Worldwide Preparation

Countries categorized by infrastructure risks

Australia, Bahamas, Belgium, Bermuda, Canada, Denmark, Finland, France, Germany, Greece, Holland, Iceland, Ireland, Israel, Italy, Japan, Mexico, New Zealand, Norway, Portugal, Saudi Arabia, Singapore, South Korea, Spain, Switzerland, Sweden, Taiwan, U.K., U.S.A.	1
Argentina, Austria, Brazil, Bulgaria, Chile, China, Columbia, Czech Republic, Dominican Republic, Egypt, Guatemala, Hungary, India, Indonesia, Jamaica, Jordan, Kuwait, Malaysia, Morocco, Panama, Philippines, Peru, Poland, Puerto Rico, South Africa, Sri Lanka, Thailand, Turkey, U.A.E., Venezuela, Yugoslavia	2
Afghanistan, Armenia, Bahrain, Bangladesh, Cambodia, Chad, Costa Rica, Ecuador, El Salvador, Ethiopia, Fiji, Haiti, Kenya, Laos, Lithuania, Mozambique, Nepal, Nigeria, Pakistan, Romania, Russia, Somalia, Sudan, Uruguay, Vietnam, Zaire, Zimbabwe	3

Source: GartnerGroup

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ent systems or wrong dates in report or alarm lists. The symptoms this work has shown up will allow these problems to be identified if they occur. In most cases the permanent solutions, involving for example upgrades or replacements, are known. Interim solutions, typically involving the isolation of a problem and working around it, have been developed for over 20% of the effects discovered. They include rebooting computers, adjusting the clock, or resetting certain parameters.

As part of the Y2K remediation work ABB has begun setting up the ABB SolutionsBank database, which will be made available to support engineers and sub-

scribing customers. This database (see page 47) will provide extremely valuable support information whenever any questions or problems arise during the critical rollover phases.

The importance of having such a database founded on hard facts cannot be emphasized too much in view of the problems which can be expected from other sources during the critical phases. Besides the 'normal' level of problems expected, preparations will also have to be made in anticipation of 'nervousness' on the part of some plant operators and people working in related organizations.

Published information about Y2K prepa-

rations in the various countries (see previous page), plus analysis of possible reasons for calls, allows at least a rough estimate to be made of the expected volume of support requests. Each ABB SupportLine Center will be staffed on the basis of the calls that can reasonably be expected.

Y2K rollover support for customers

Organized access to ABB's engineering know-how, combined with a reliable and adequate means of communication, plus the right tools and databases, is exactly the kind of high-value support ABB's customers expect. Customers should know that ABB

Y2K: Rollover Support Solution
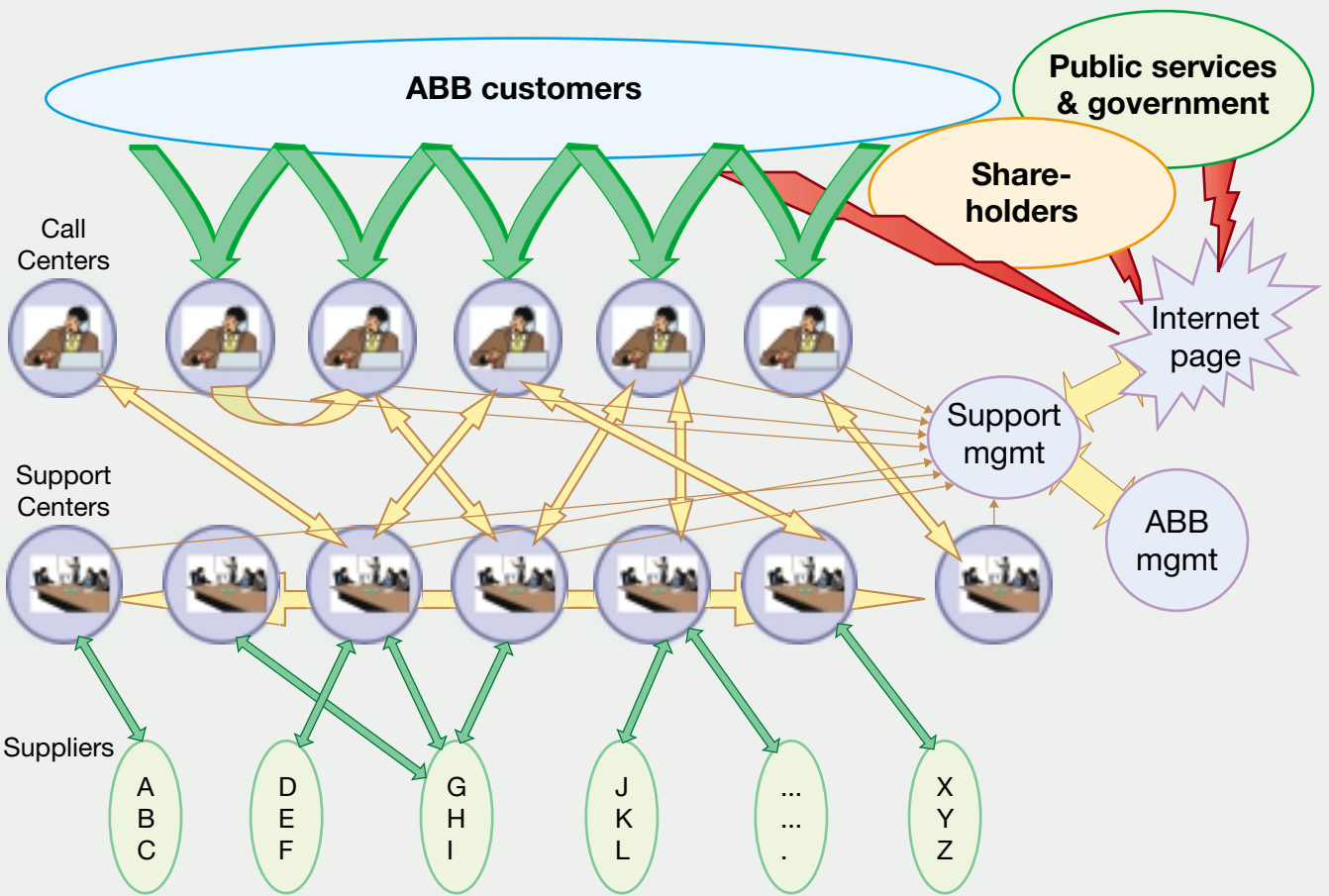
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will stand by them through the critical rollover phases whether they experience problems or not, and even if their only problem is that of uncertainty.

The rollover support is being prepared around the existing ABB SupportLine Center Network and draws heavily on its experience base, with all the features applying specifically to Y2K rollover support added. Within this network call centers will be local and close to customers. Important benefits include speaking the local language and having local knowledge of customers' installations (see box on next page).

Reliable communication will be critically important within the complex call and support center network. For this ABB has its Corporate Network, which consists of dedicated, redundant high-capacity lines. All the network equipment has been checked for Y2K compliance, and back-up power is provided for the critical network resources. During the rollover ABB will give communications priority to the call and support center communication. All the customer has to do is check and verify the (usually very short) link to the nearest local call center. This local connection may be made via phone, fax or mobile phone, all of which should provide the required reliability. A satellite phone or the internet may also be considered in exceptional cases.

The local call centers will be supported by the ABB SolutionsBank, and ABB is providing special training in dealing with specific Y2K issues. The main tasks of these centers will be documenting the problem and the overall process, assigning call priorities, dispatching each call to wherever it will be professionally handled, solving the problem or passing it on to the appropriate support center.

Global SupportLine centers will try to solve the problems referred to them by local centers, developing workarounds if the permanent solution is likely to take longer to verify and deliver. Chief engineers responsi-

ble for products, systems, plants or customer projects will participate when global specialists are unable to find solutions. Information on general problems and their solutions will be entered in the ABB SolutionsBank and made available to all the call centers. Another task of the global support centers is to provide a link-up to suppliers and other support centers when needed, so that interface problems involving systems
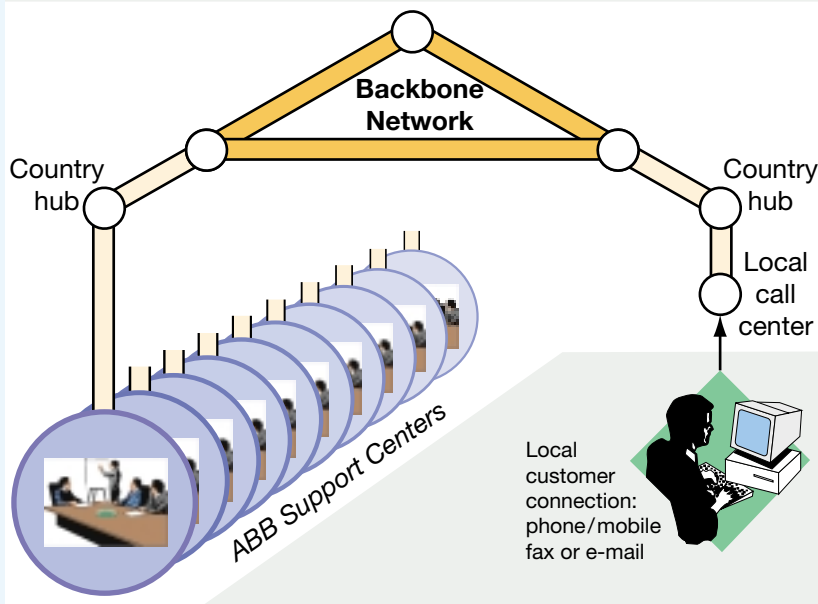
Y2K: Technical Support

SupportLine Process

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Y2K: Rollover Countdown

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ABB Corporate Network
Highly reliable worldwide communication

The main communications infrastructure will be the ABB Corporate Network. Features include:
- Dedicated high bandwidth lines
- High reliability due to redundant main lines
- No risk of capacity bottlenecks caused by non-Y2K-relevant communication
- Priority given to Y2K support process

Customers need only to verify the short local connection to the nearest call center via phone, fax or cellular phone.

from different suppliers – which can be a main source of trouble during remediation – can be tackled.

In addition to these activities ABB will provide information based on rollover experience in the different time zones. ABB has customers operating every kind of installation in Australia, New Zealand and East Asia. Their specific rollover experience is obviously of major interest to the operators of plants in other parts of the world where the rollover will take place later, for example with a delay of 6 to 10 hours in Europe and 12 to 16 hours in the Americas. These customers will provide ABB with specific information about plants in the industries and utilities served by the company and which could be of important additional value.

Conclusions

An event as unique as the Y2K rollover clearly involves huge areas of uncertainty. Massive resources have therefore been allocated to preparing for it. While the cost would seem high for just maintaining reliable operation, not all of it can be seen as being invested solely in Y2K compliance. Benefits accruing from the investment, for ABB as well as its customers, will go well beyond the year 2000. They include system modernization, system analysis, customer databases, system inventories and deeper understanding of plants, to name but a few.

In the opinion of ABB one of the main benefits is the large leap forward in creating advanced support and service relationship which can enhance plant reliability while re-

ducing maintenance costs. The concept of know-how logistics has proved its worth in numerous operations, and ABB is taking this opportunity to extend the concept into its plant and equipment businesses. The experience gained in a whole range of industries, coupled with the knowledge and tools needed to make it possible, show that know-how logistics will make a very valuable contribution to ABB's business activities as well as to industrial plant performance in the future.

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