AUTO-ID CENTER

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O. What is the AUTO-ID Center?

A. The Auto-ID Center is a not-for-profit global research organization headquartered at the Massachusetts Institute of Technology. Founded in 1999the Auto-ID Center's vision is of a world where computers will be able to identify any object, anywhere, instantly. Further, the Center's mission is to design the infrastructure and develop the standards to create a universal, open network for identifying individual products and for tracking them as they flow through the global supply chain. The Center has sister labs at the University of Cambridge in England and Adelaide University in Australia. Plans are under way to expand into Japan and China.

Q. Why replace bar codes? What's the difference?

A. The Auto-ID Center does not advocate replacing bar codes, as bar-code-based systems such as the UPC are a standard automatic identification technology in many industries, and will be an important legacy system for many years. But all bar codes have a fundamental limitation: they are a line-of-sight technology. This has a number of important consequences. First, in most cases, they need to be scanned manually. Second, bar codes need to read individually, and, therefore, singulated. Multiple items cannot be read at one time.

ID technologies that can be read without line of sight overcome these limitations. There is no need for manual intervention, so they can be read constantly in many applications (e.g., a shelf also can be a reader, and can automatically know what it contains, in real-time and with a high degree of accuracy), and there is no need for singulation, so reading is possible throughout the supply chain.

Q. What exactly is the technology that the Center is working on?

A. The Center is designing the critical elements of the new EPC network. They are also developing the standards needed to ensure that products can be identified regardless of which manufacturer tags them, and they are building some of the software that will help manage the flow of data. This will create a global system that will revolutionize how products are manufactured, tracked, sold, and recycled. The Center's research focuses on developing five fundamental elements for automatic identification. These elements include:

- Electronic Product Code (EPC)
- ID System (Radio Frequency Readers and Tags)
- Object Name Service (ONS)
- Physical Markup Language (PML)
- Savant

These elements will be combined with a network of tags, readers, and computers to enable – in the case of business adoption – manufacturers and retailers the opportunity to accurately track inventory in real time.

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Q. What will the Center actually deliver and when?

A. The Auto-ID Center is focused on creating standards and the basic software needed to create a new network for tracking items using low-cost RFID tags. Through the end of 2003, we will be publishing a series of detailed technical specifications and documentation to enable vendors to create and develop related products and services. We will also be developing some of the network architecture to the point where it is ready to be used and commercialized by industry. By the end of 2003, we will have enabled vendors and users to start investing in EPC-related technology with reasonable assurance that the technology works, that there are compelling commercial reasons to do so, and that the public will be comfortable with the technology.

Q. Who owns the intellectual property created by the Auto-ID Center?

A. The Auto-ID Center is a unique partnership between industry and academia. Strictly speaking, the intellectual property belongs to the universities where our research is conducted. However, the intellectual property will be freely available to any company that wants to use it.

Q. What makes the Auto-ID Center unique? Is there any competition?

A. Companies have long formed groups to promote the interests of a particular industry or to lobby governments for changes to particular laws. But the Auto-ID Center may be the first time in history that companies from different industries and different regions of the world have come together to develop technology they feel would benefit their businesses – and their competitors' businesses.

There are groups of RFID vendors that have come together to propose standards or to foster the development in the RFID industry in other ways. These are not, however, the Auto-ID Center's competitors. None are focused on developing an open, global network for tracking individual items with low-cost RFID tags and readers.

Q. How are you testing the technology?

A. In early October 2001, the Auto-ID Center, and a group of its sponsors, launched a field test within a real life supply chain in the U.S. Pallets, carrying inventory such as paper towels, were embedded with RFID tags carrying unique Electronic Product Codes (EPC). The test, which is being staged over several phases of increasing complexity, will run for at least nine months and involves more than 20 companies. Auto-ID researchers, in conjunction with sponsors and partners, will use the test to evaluate the performance of the technology and evaluate applications for the EPC and related systems.

Phase I tracked pallets of merchandise provided by the manufacturers participating in the test. The technical testing in this phase is of the software and system design. The primary objective of Phase I was to evaluate the performance of the various elements of the technology (i.e., EPC, ONS, PML). Phase II has focused on "stress testing" the system to make sure it can handle larger amounts of inventory and the information that is associated with that inventory. Phase III will focus on testing the prototype cheap tags and readers, taking the system to the next level of complexity.

Q. What is the Auto-ID Center doing to protect privacy?

A. Protecting privacy is one of the Center's most important missions and the Center has taken very important steps toward addressing the privacy issue, including drafting a privacy policy statement and designing the EPC architecture so that it protects personal privacy. There are a number of strong security measures built into the system. These include:

<u>Physical protection</u> -- EPC chips on individual items cannot be read at ranges of more than about 3 feet. The only way they could be read is if a special reader device is placed close to them. In addition, fundamental laws of physics mean that the chips on individual products can't be read through thick materials such as walls or floors.

<u>Data protection</u> -- EPC chips contain no useful data – just a unique code number that refers to information held remotely on a secured networked system. Access to this information is restricted and controlled. For example, once you buy a product from a store, some of the information could cease to be available to anybody, even to the store that sold it. No system is completely secure, but Internet security is very good, and it offers a strong layer of protection.

<u>Personal Protection</u> -- EPC data identifies physical objects, not people. Therefore, the system will not be able to associate an individual with the objects he or she buys. This may be done by other computer systems – like the ones stores use today if you use a loyalty or affinity card when you pay for your purchases – but it is not done by the EPC system, nor will it be.

Q. When will this technology be available?

A. Today, EPC is still in research. We estimate that EPC technology could be commercially applied within the next 2 to 3 years, at least in very niche applications. The major considerations are reducing the price of the ID chips while increasing their performance, and creating a system architecture that will scale up to huge volumes and benefit everyone. Of course, there are no crystal balls in technology and things could go much faster or slower, but these are our most optimistic timings.

Q. If you look five years ahead, into the future, what will the supply chain look like if the Auto-ID concept is successful?

- A. If Auto-ID is successful, the first change will be that we will actually know what the supply chain looks like for the first time. Other changes: transaction costs will be reduced; lead times for manufacture and delivery will get shorter; inventory will go down; customer availability will go up. There will be more accountability, and with that, more security, safety, and traceability.
- Q. How would you rank this initiative within the various other initiatives the industry is undertaking to improve efficiencies, such as collaborative planning & forecasting, centralized catalogues, and global exchanges?
- A. Auto-ID is an enabling technology for pretty much everything else companies are doing in Business-to-Business IT right now. Technologies like B2B Exchanges focus on sharing data Auto-ID is about capturing that data in the first place. These things go hand in hand. Capturing the data is fundamental, but so is doing something useful with it once you have it.