SQL Server Notifications in a manufacturing environment

How can you know when a table changes?

- Polling: simple but wasteful
- Triggers: reliable but a permanent burden
- Query notifications: efficient but requires new application design

Why are message queues necessary?

- Asynchronous communication between programs (like email)
- Allows failure of either side
- Provides query notifications and database mail (since SQL Server 2005)

How can I use a query notification?

- Use C# SqlDependency
- Register your query with the SQL Broker
- Receive callback on background thread when database says your cached query is invalidated

What are the main types of computers in a manufacturing plant?

- Enterprise Resource Planning (ERP): orders, inventory management, billing, audits
- Manufacturing Execution System (MES): production database, non-realtime systems
- Programmable Logic Controllers (PLC): realtime control systems (motors, lights, etc.)

What are the common assembly tools?

- Torque guns: affixes bolts, nuts, or other fastners to build vehicles
- Barcode scanners: error proofing the parts used and recording serial numbers for billing
- RF-ID readers: identifying the vehicle in station
- Industrial PCs: tell operators what to do and automatically enforce quality rules

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Are we there yet? Are we there yet? Queries that poll a database looking for changes can waste tremendous amounts of network bandwidth, CPU, and other precious database server resources. By changing the structure of your SQL client to use query notifications rather than polling, you can reduce computational load on both the client and the server. We'll review how you can use query notifications from C# or VB.NET to receive notifications from Microsoft SQL Server. We'll compare polling, database triggers, and query notifications, with respect to speed, reliability, and ease of implementation in a software bug tracking system.

Next, we'll examine a case study of how these types of notifications can be implemented in an automotive assembly plant. The Toledo North and South Assembly Plants produce the Jeep Cherokee and Wrangler, respectively, and we'll review a video explaining the assembly process at these plants with a special emphasis on some of the computer systems driving them. Given your newfound knowledge of query notifications, you'll easily be able to understand why speed and reliability are so important in this environment. Examples of notifications include determining the positions of vehicles on the production line with RF-ID readers and real-time detection of production line failures.