The question of "real-time" decision support has been addressed in articles and books for almost 30 years, but as computing, sensor, and networking technology changes and provides new capabilities our expectations for "real-time" DSS are increased. At a fundamental level, the hope has always been that our information and decision support systems will help decision makers monitor events, and evaluate, choose and act on alternatives as events actually unfold.

An email from Neil Raden in late October prompted this Ask Dan! and my investigation of "real-time" decision support. Neil wrote "I read the article about Anderson Clayton, and I'm scratching my head a little. What is it about this application that you consider "real-time"? As far as I can tell, the implication is that if you request a report and/or analysis, and the system responds to you, it's real-time. I don't think this is a standard definition. What makes BI real-time is some form of straight-through processing, flowing data into the data warehouse from the source as it occurs, rather than in a periodic ETL and refresh cycle."

Neil was referring to a case study at DSSResources.COM by Eric Vollmer titled "Anderson Clayton Corp. Delivers Real-Time Business Intelligence to U.S. Cotton Growers" that was posted at DSSResources.COM July 12, 2002. Eric Vollmer is the MIS Director at Anderson Clayton and he reports the implementation of a SQL Server data warehouse and arcplan's business intelligence platform dynaSight. The Web-based, data-driven DSS was developed to support Anderson Clayton managers and growers. This case was also published in DM Review in August 2002.

My response to Neil was "I think arcplan and Eric Vollmer, MIS Director, Anderson Clayton Corp., mean by "real-time" just what you've concluded ... 'if you request a report and/or analysis, and the system responds to you, it's real-time'. I agree that's not saying much these days with the Web. For many years, that was the best we could do. Real-time on the back-end makes a data warehouse more like a TPS."

It turned out that "real-time" decision support continued to be an issue. N. Stevenson asked about DSS for the timely detection of epidemics in a DSSResources.COM bulletin board posting of 11/13/2002. Stevenson noted "Because of the threat of bioterrorism, timely detection of epidemics in real time is of increasing importance." I agree. Weather forecasters, emergency response personnel, military commanders, production managers, air traffic controllers, and many others now use real-time information to make important decisions. The importance of such systems is increasing.

Twenty five years ago, Prof. Robert Thierauf wrote a number of books (1975, 1982) that dealt with on-line, real-time MIS and DSS. He explained in 1982 that "any system that processes and stores data or reports them as they are happening is considered to be an on-line real-time system (p. 20)." His broad definition seems to be used in many current discussions.

A search at Google.COM with the phrase "real-time" produced 6,120,000 results. The search identified pages on getting real-time quotes and streaming charts from the NYSE, getting real-time news, and producing and generating real-time financial and stock reports. Vendor pages discuss sharing information in real-time on the Web and providing computer support for real time collaborative work. Companies are tracking expenditures against budgets in real-time.

One vendor claims its software logs call details into a SQL database and displays real-time information for supervisors. Another site advertises that it provides real-time SEC filings and

corporate reports and that it has an email alert service. One finds online real-time auction websites, the ATCSCC Real-time Airport Status page at http://www.fly.faa.gov/flyFAA/index.html, and the NCAR-RAP Real-Time Weather Data website. Trend Micro (http://www.trendmicro.com) uses a dynamic map to analyze worldwide computer virus trends in real time and to predict virus outbreaks and prevent them proactively.

A number of companies market software for real-time decision support. Environmental Software and Services markets RTXPS (www.ess.co.at/RTXPS/), a real-time expert system environment for on-line decision support applications. CGE&Y (www.cgey.com) has a suite of DSS optimization services to provide real-time inputs to decision support systems. Intergraph (www.intergraph.com) software was used to build an Evacuation Decision Support Solution that assists South Carolina decision makers in managing evacuations during a hurricane.

Academic papers on the Web discuss artificial intelligence in real-time control, real-time dynamic telepathology through the Internet, real-time status displays, real-time speech translation, real-time freeway traffic routing and real-time traffic maps. In July 2002, AAAI/KDD/UAI held a Joint Workshop on Real-Time Decision Support and Diagnosis Systems in Edmonton, Canada. Stankovic, Son, and Hansson (1999) have a paper on the Web that provides a sophisticated discussion of real-time databases. They discuss time semantics, time consistency and misconceptions about real-time databases. They also summarize research issues related to real-time databases.

In the popular technical press, real-time issues are also being discussed. Erika Morphy (2002) in CRMDaily.com argues "Now that a lot of companies have gotten their arms around automating operational data, there is an increasing focus to develop more sophisticated analytics." She discusses a 2002 IDC report, titled "In the Nick of Real Time: CRM Analytics and the Decision Process". The IDC report concludes incorporating real-time into CRM analytics processes is a critical component for successful decision making.

Last fall, Heather B. Hayes (2001) in an article on Decision Support Systems in Washington Technology wrote "More recently, the race to develop real-time decision support applications, as well as real-time data warehousing, has quickened significantly. Vendors such as i2 Technologies and Oracle are pioneering new models for real-time decision support applications, infrastructures and solutions. And business intelligence vendors are seeking out partnerships with companies that provide message brokering systems."

Conclusions

Are we seeing the "dawn of the real-time enterprise"? Margulius (2002) and others seem to think so. WAP-enabled mobile phones will deliver data in real-time to managers, sales staff and emergency personnel, companies will have active datawarehouses, extensive event data will be recorded in real-time, and business analytics will be available in real-time or "near real-time". In general, there will be a greater expenditure in the future of funds on real-time DSS for operational decision support. The possibilities for on-line, real-time decision support in 2002 are much broader than they were in 1982 and the systems will certainly be more powerful, but the concept hasn't changed.

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The above response is from Power, D., What is "real-time" decision support? DSS News, Vol. 3, No. 24, November 24, 2002.

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Last update: 2005-08-06 21:39