

: *What is DSS 2.0?*

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Discontinuities and major technology change can result in improving and significantly altering the scope and directions of a technology application area. That has happened in the area of decision support systems. For 40 years decision support systems slowly developed and increased in use and deployment. In June 2007, a major technological discontinuity occurred with the official release and broad availability of the Apple iPhone. This column reviews the evolution of DSS 1.0 and compares DSS 1.0 to DSS 2.0.

DSS are **not** legacy systems. Companies have obsolete DSS that need to be replaced or upgraded, but the concept of decision support is **not** an old or outdated method, technology or application program. DSS must continually be improved and new DSS must be invented. DSS 2.0 refers to a major change in capabilities and technologies that has occurred in the design and deployment of decision support.

Much has changed in the field of Decision Support since June 29, 2007 when the first generation Apple iPhone was released. New data sources are creating interest and excitement for more and better analytic decision support. Location data and streaming video, user generated and social media data, machine data, RFID and other new data sources are creating opportunities for novel analytical decision support. To exploit these data sources researchers and practitioners specializing in analytics and decision support need to expand their tool kits of technologies to include new data management technologies like Hadoop, Hive, Pig, and other No SQL or not only SQL databases, new visualization software like Tableau, visual simulation modeling tools, open source virtual world platforms, mobile computing and Cave environments, new software for statistical analysis and other open source business intelligence and modeling tools. The goal of this review is to briefly survey, organize and summarize these diverse technologies that can be used with new data sources to implement interesting use cases for the next generation of analytical decision support. This goal is challenging, but a broad brush, vendor neutral, generalist perspective on our expanding technology development tool space can help all of us better understand how our field is evolving. The big picture for DSS 2.0 is interesting and exciting.

DSS 1.0 can be characterized by the following attributes: dedicated systems with simple architectures;
Small data stores;
a single user or a small number of concurrent users;
driven primarily by historical operational data often with periodic updates;
using a desktop form factor for users;
and static representations of data.

: *What is DSS 2.0?*

DSS 2.0 can be characterized by the following attributes: integrated systems with complex architectures;
very large data stores;
many concurrent users;
many data sources including multimedia and real-time data;
many end user form factors;
sophisticated touch and voice interfaces;
dynamic representations including visual analytics, interactive dashboards and simulation tools;
more use cases especially with location awareness; and
improved usability

Both analysis of data and use of models has been a focus of decision support systems since the mid-1970s. One of the first data-driven DSS was built using an APL-based software package called AAIMS, An Analytical Information Management System at American Airlines. In the late 1970s, the first EIS were developed by Northwest Industries and Lockheed. In about 1990, data warehousing and On-Line Analytical Processing (OLAP) broadened the realm of EIS and defined a broader category of data-driven DSS. Currently there is a broad array of descriptive analytics, diagnostic analytics, predictive analytics and prescriptive analytics.

The introduction of the Apple iPhone was a major technology discontinuity. Mobile phones and mobile computing is having a major impact on decision support. More data, “real” mobility, new interfaces, location awareness and social decision support. Web 2.0 was a related technology change that enables DSS 2.0. This discontinuity event is significant enough to demarcate DSS 2.0 from DSS 1.0. Version numbers are usually assigned in increasing order and correspond to new developments in software.

DSS 1.8 indicates an incremental change, DSS 1.82 a very minor change, DSS 2.0 indicates a major change. Mobile phones and mobile computing is having a major impact on decision support.

One can identify generations of decision support. The following summarize past changes: DSS 1 were built using timesharing systems.

DSS 2 were built using minicomputers.

DSS 3 were built using personal computers and tools like Visicalc, Lotus and Excel.

DSS 4 were built using DB2 and 4th generation languages.

DSS 5 were built using a client/server technology on LANs.

DSS 6 were built using large scale data warehouses with OLAP servers.

DSS 7 were built using Web technologies.

What is typical of “modern” decision support? Access capabilities from any location at anytime.

Access very large historical data sets almost instantaneously.

Collaborate with multiple, remote users in real-time using rich media.

: *What is DSS 2.0?*

Receive real-time structured and unstructured data when needed.
View data and results visually with excellent graphs and charts.

How has Web 2.0 impacted the design and development of decision support systems?

What new data sources are being used for decision support? Volumes of semi- and unstructured data;

Location data;

User generated and social media data;

Machine data;

RFID, sensors; and

Video, multimedia;

What is expected in next-generation decision support? A customizable, high resolution, graphics-intensive user interface;

Dynamic, "real-time", data-driven analysis capabilities;

More powerful and easier to construct visual simulation models that decision-makers can interact with;

Small, wearable, wireless computing and communication devices;

Easier collaboration;

Knowledge-driven assistance; and

Time, context, person and location awareness in real-time.

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Last update: 2014-07-19 04:14