Center for Decision & Information Technologies
UNT

# DIVINING THE FUTURE
# Business Focus 2012(.83)

Jerry L. Dake, PhD - Decision Sciences
Vess Johnson – PhD Student BCIS
ITDS Department
University of North Texas
October 2012

Center for Decision & Information Technologies
UNT

# Concept

Divination (from Latin *divinare* "to foresee, to be inspired by a god"[2], related to *divinus*, divine) is the attempt to gain insight into a question or situation by way of a standardized process or ritual.[3] Diviners ascertain their interpretations of how a querent should proceed by reading signs, events, or omens, or through alleged contact with a supernatural agency.[ (Wikipedia)

Center for Decision & Information Technologies

UNT

# Tools
# (Signs, Events & Omens)

## READ, LISTEN,COUNT
## and
## FOLLOW THE $$$$$$$$$

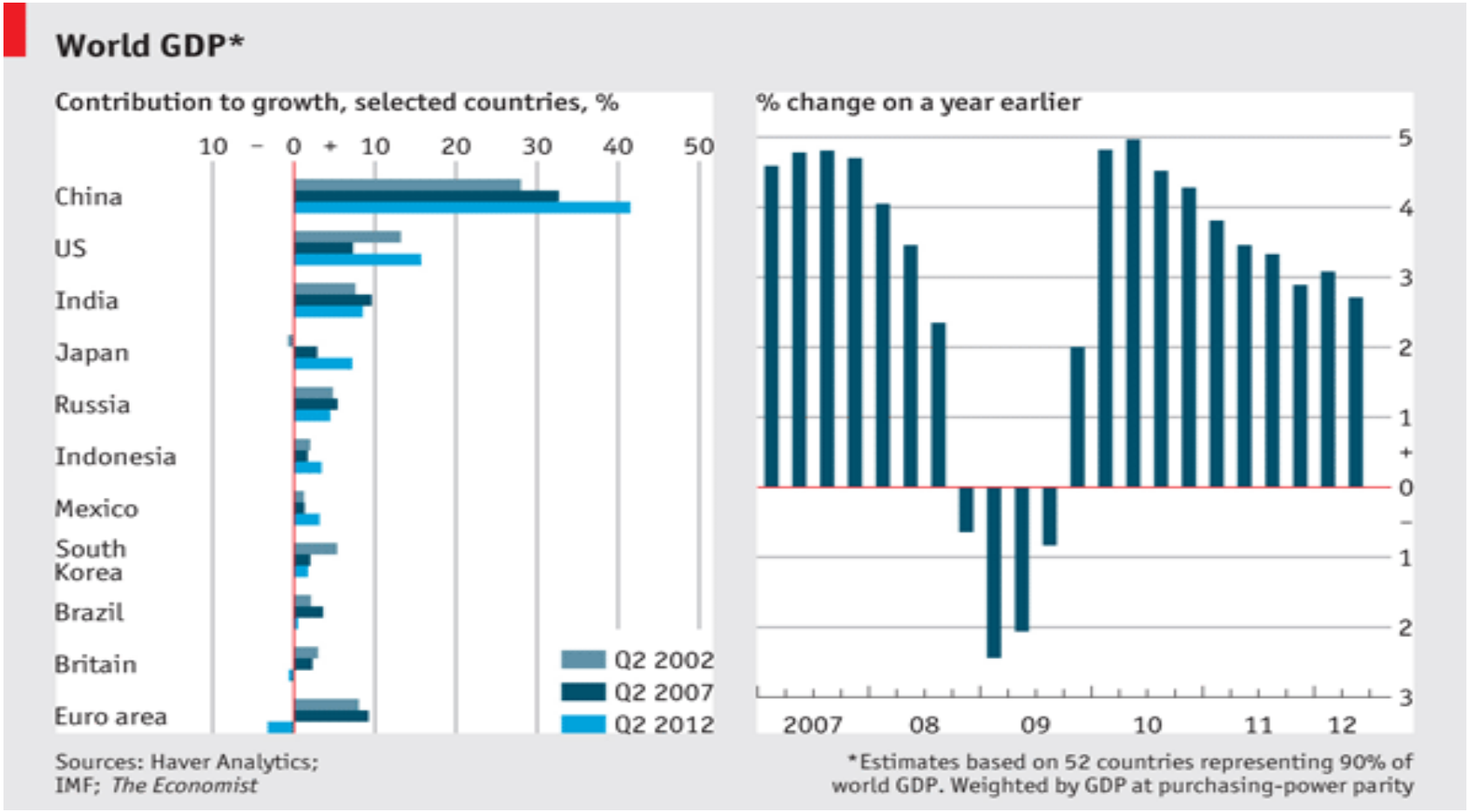
Center for Decision & Information Technologies
UNT

# STEERING CURRENTS
## WORLDWIDE

- Business is global and “globalization” will continue; but the area of focus will gain more momentum re the far-east and emerging markets.
- World wide unemployment will be a continuing issue based on “new skills” needed.
- Energy costs will continue to fluctuate based on the global condition noted below.
- Risk, the assessment of risk (risk aversion) will have a continuing focus based on global economic and political uncertainty.

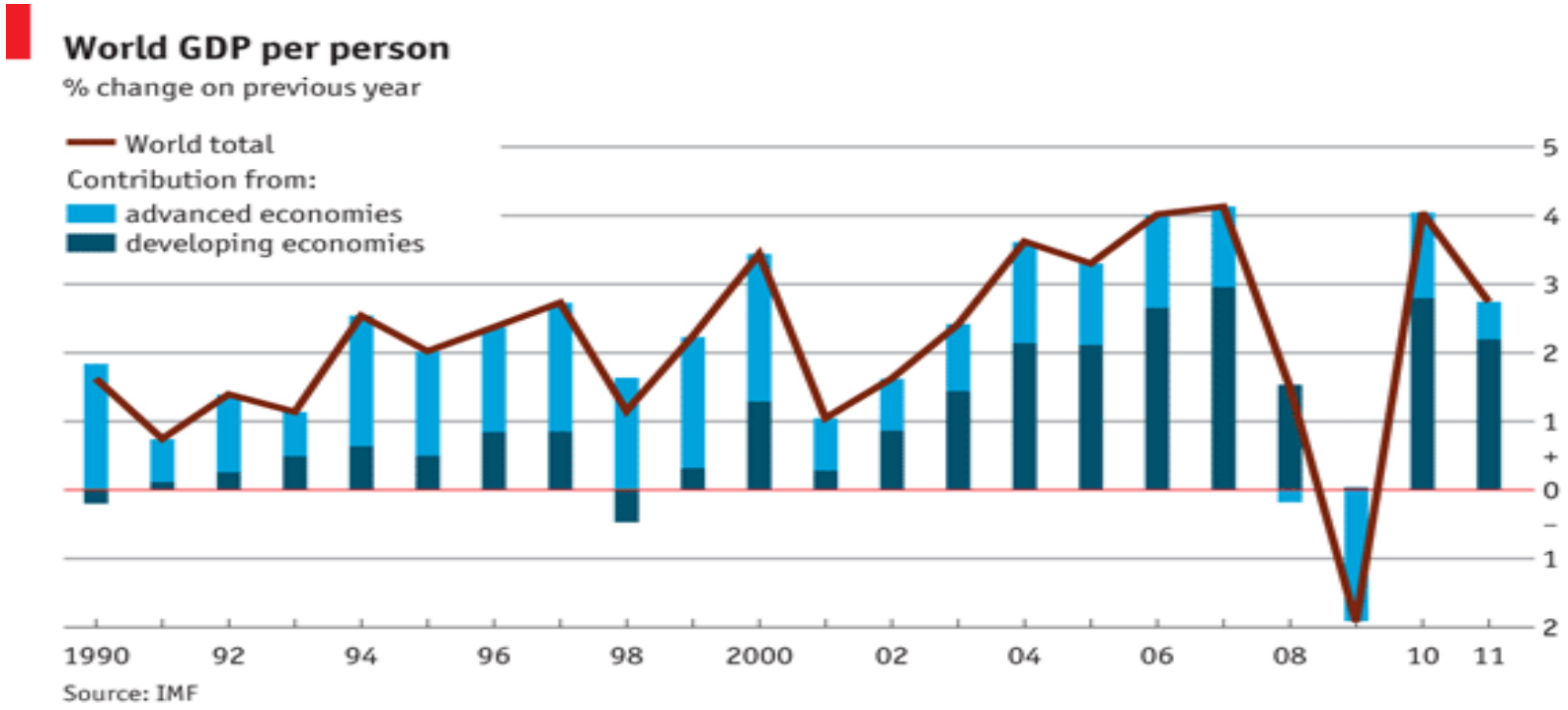
Center for Decision & Information Technologies
UNT

# The Great Shift
# Last 5 Years*



Center for Decision & Information Technologies
UNT

# The Great Shift*
# The Last Two Decades



# STEERING CURRENTS
## USA

- Jobs, jobs and more jobs.
- Waiting for the election – check in November
- Exporting will become more pressing issues going forward in the U.S.
- More focus on “Will my education get me a job”?
- Microsoft Says 6,000 Jobs Open, Wants More Visas

Microsoft says it can't find enough skilled IT workers to fill open positions, but critics say the company is merely trying to justify hiring foreigners. *

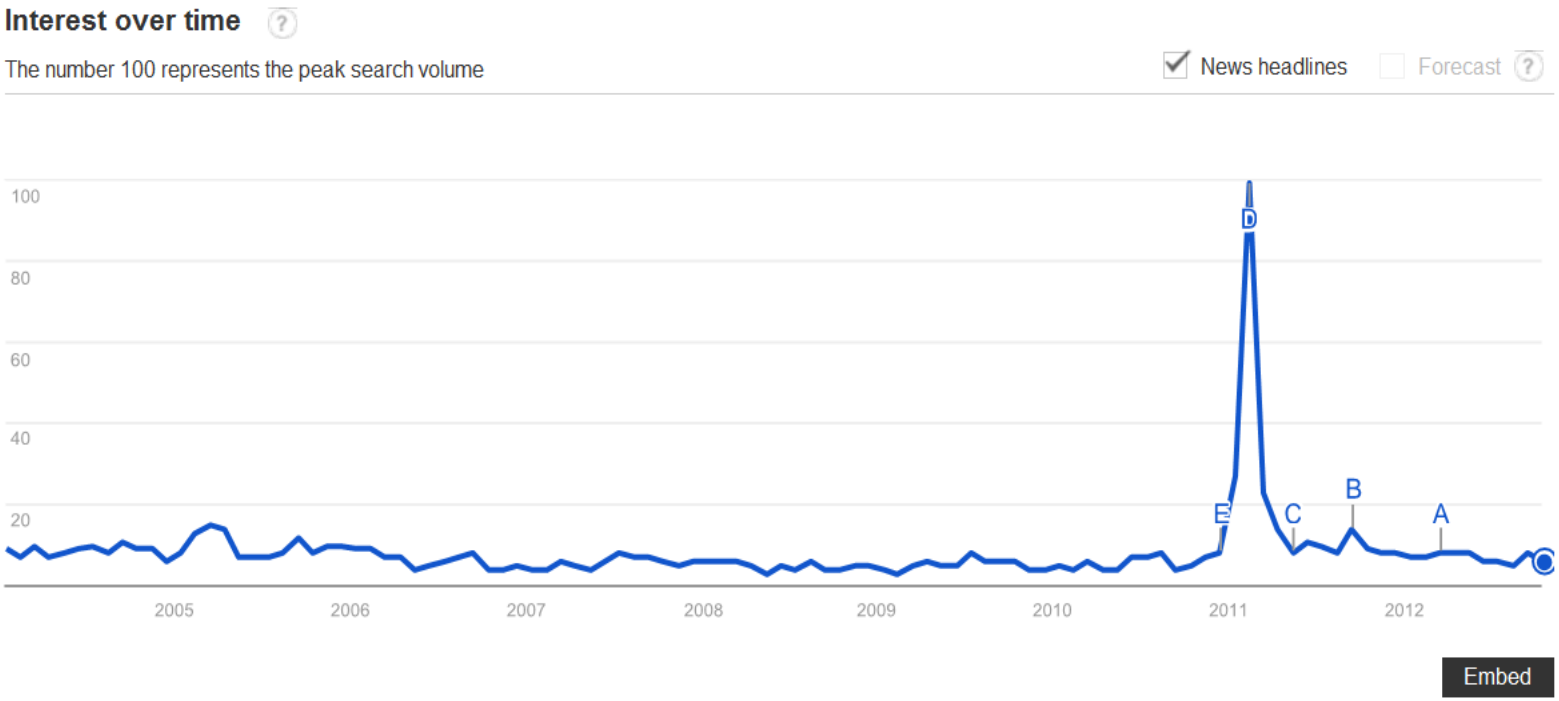
Center for Decision & Information Technologies
UNT

# STEERING CURRENTS
## TECHNICAL

- Speed, speed and more speed in analysis will continue to drive forward at a fast pace.
- Security is a problem and will continue to be a greater problem for business operations; including software systems as data continues to mount; both in collection, storage and mobility. And now we can add Cyber Warfare.
- The overall trend toward mobile communication and computing will continue to expand unabated.
- More data – more data – more data (stored and analyzed).
- Computing power, medical databases and the economic ability to develop a human genome

Center for Decision & Information Technologies UNT

# Watson - Computer

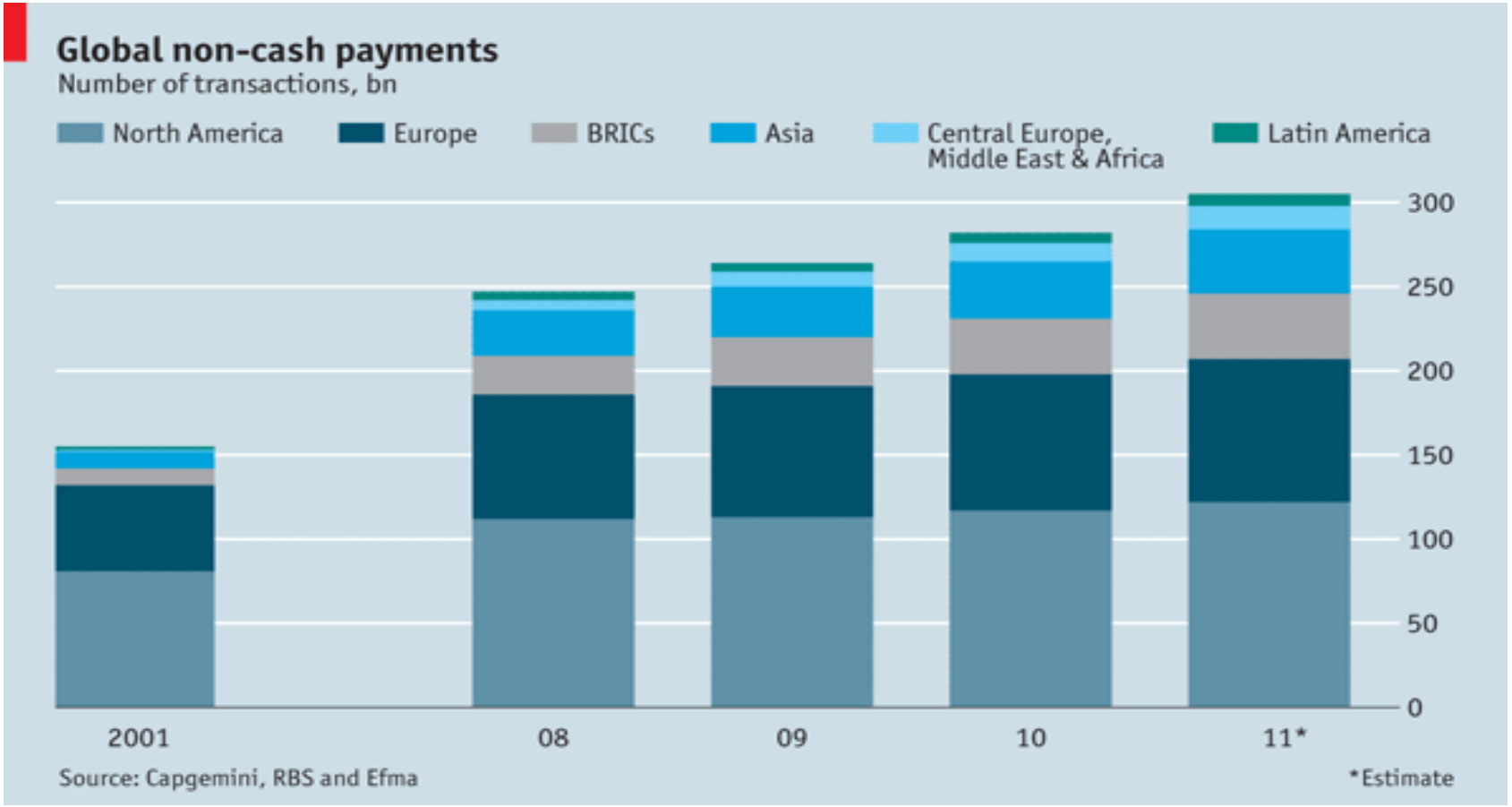


# STEERING CURRENTS
## CULTURAL

- Mobility in the population/communication access any place at any time.
- Owning a home ties me to one physical location too much?
- The need to be connected on multiple media at all times?
- Population aging has driven greater and greater interest in medical computing.
- Social media statistics do not yet show it slowing down; but informal observation at UNT this Fall suggests students are actually “watching where they are walking” and not using phones as much in classes”????????

Center for Decision & Information Technologies UNT

# Technology & Culture



Center for Decision & Information Technologies UNT

# BIG DATA 2010

In information technology, **big data**[1][2][3] is a collection of data sets so large and complex that it becomes difficult to process using on-hand database management tools. The challenges include capture, storage,[4] search, sharing, analysis,[5] and visualization. The trend to larger data sets is due to the additional information derivable from analysis of a single large set of related data, as compared to separate smaller sets with the same total amount of data, allowing correlations to be found to "spot business trends, determine quality of research, prevent diseases, link legal citations, combat crime, and determine real-time roadway traffic conditions."[6][7][8]*

Center for Decision & Information Technologies UNT

# BIG DATA 2012

In information technology, **big data**[1][2] is a collection of data sets so large and complex that it becomes difficult to process using on-hand database management tools. The challenges include capture, curation, storage,[3] search, sharing, analysis,[4] and visualization. The trend to larger data sets is due to the additional information derivable from analysis of a single large set of related data, as compared to separate smaller sets with the same total amount of data, allowing correlations to be found to "spot business trends, determine quality of research, prevent diseases, link legal citations, combat crime, and determine real-time roadway traffic conditions."[5][6][7]

Center for Decision & Information Technologies
UNT

# Big Data Trends*

# Follow the $$$$$

**Big Data Drives Big IT Spending**

IT spending will hit $34 billion by 2013 as companies upgrade and adapt existing infrastructures to meet the demands of big data, Gartner research predicts.

**Kevin Fogarty** InformationWeek
October 18, 2012

**Health IT Execs Urged To Promote Big Data**

**Some health IT leaders are already enthused about the potential of big data, but questions persist about its relevance to healthcare delivery reform.**
By **Ken Terry** InformationWeek

**Pittsburgh Healthcare System Invests $100M In Big Data**
University of Pittsburgh Medical Center's data warehouse and sophisticated analytics engine will foster personalized medicine, population health management, and administrative efficiencies.

Center for Decision & Information Technologies
UNT

# Data Scientist

- Monica Rogati: By definition all scientists are data scientists.

- In my opinion, they are half hacker, half analyst, they use data to build products and find insights. It's Columbus meet Columbo – starry eyed explorers and skeptical detectives.*

Center for Decision & Information Technologies UNT

# Data Science - 2012

**Data science** is a discipline that incorporates varying elements and build on techniques and theories from many fields, including Math, Statistics Data Engineering, Pattern Recognition and Learning, Advanced Computing, Visualization, Uncertainty Modeling, and Data Warehousing and high performance computing with the goal of extracting meaning from data and creating data products. Data Science is a novel term that is often used interchangeably with "Competitive Intelligence," or "Business Analytics" although it is being more commonly to embody each of these disciplines together. Data Science seeks to use all available and relevant data to effectively tell a story that can be easily understood by non-practitioners.

# Data Scientist - 5 of 140 million hits

- IBM - What is a *Data Scientist*? – Bringing big data to the enterprise

*www.ibm.com/software/**data**/infosphere/**data-scientist**/*Cached

You +1'd this publicly. Undo

Rising alongside the relatively new technology of big data is the new job title " *data scientist*." While not tied exclusively to big data projects, the *data scientist* role **...**

- The *Data Scientist* Will Be Replaced By Tools - Forbes

*www.forbes.com/sites/.../the-**data-scientist**-will-be-replaced-by-tools/*Cached

You +1'd this publicly. Undo

Aug 31, 2012 – We've barely started to use the term "*data scientist*" and the demise of this new profession is already predicted? Well, it's not one more "rise of **...**

- *Data Scientists*: The Definition of Sexy - Forbes

*www.forbes.com/sites/gilpress/.../**data-scientists**-the-definition-of-sex...*Cached

You +1'd this publicly. Undo

Sep 27, 2012 – A pocket protector. (Photo credit: Wikipedia) I put "sexy" in the title because I'm told that the words in the title make all the difference in getting **...**

- Harvard Business Review: *Data Scientist* Is The 'Sexiest Job Of The **...**

*www.popsci.com/**science**/.../harvard-business-review-**data-scientist**-se...*Cached

You +1'd this publicly. Undo

Sep 20, 2012 – What is the sexiest job of the 21st century? If you said "*data scientist*," you're probably an editor at Harvard Business Review and probably not.

- *Data Science* 101 | Learning To Be A *Data Scientist*

***datascience**101.wordpress.com/*Cached

You +1'd this publicly. Undo

3 days ago – This is a great talk about how much clinical trial *data* is never published. It is a bit scary but definitely something people should be **...**

Center for Decision & Information Technologies
UNT

# The Big Data Surge*

**IBM's Big Data Platform:** Turning Promise to Reality

**How to Get Started with Your First Big Data Project**

**Big Data Analytics Meets Social Media:** Understanding & Responding to Your Customer in Real-time

**The IBM Big Data Platform for Analytics**

**Big Data:** The Next Frontier in Data Warehousing and Analytics

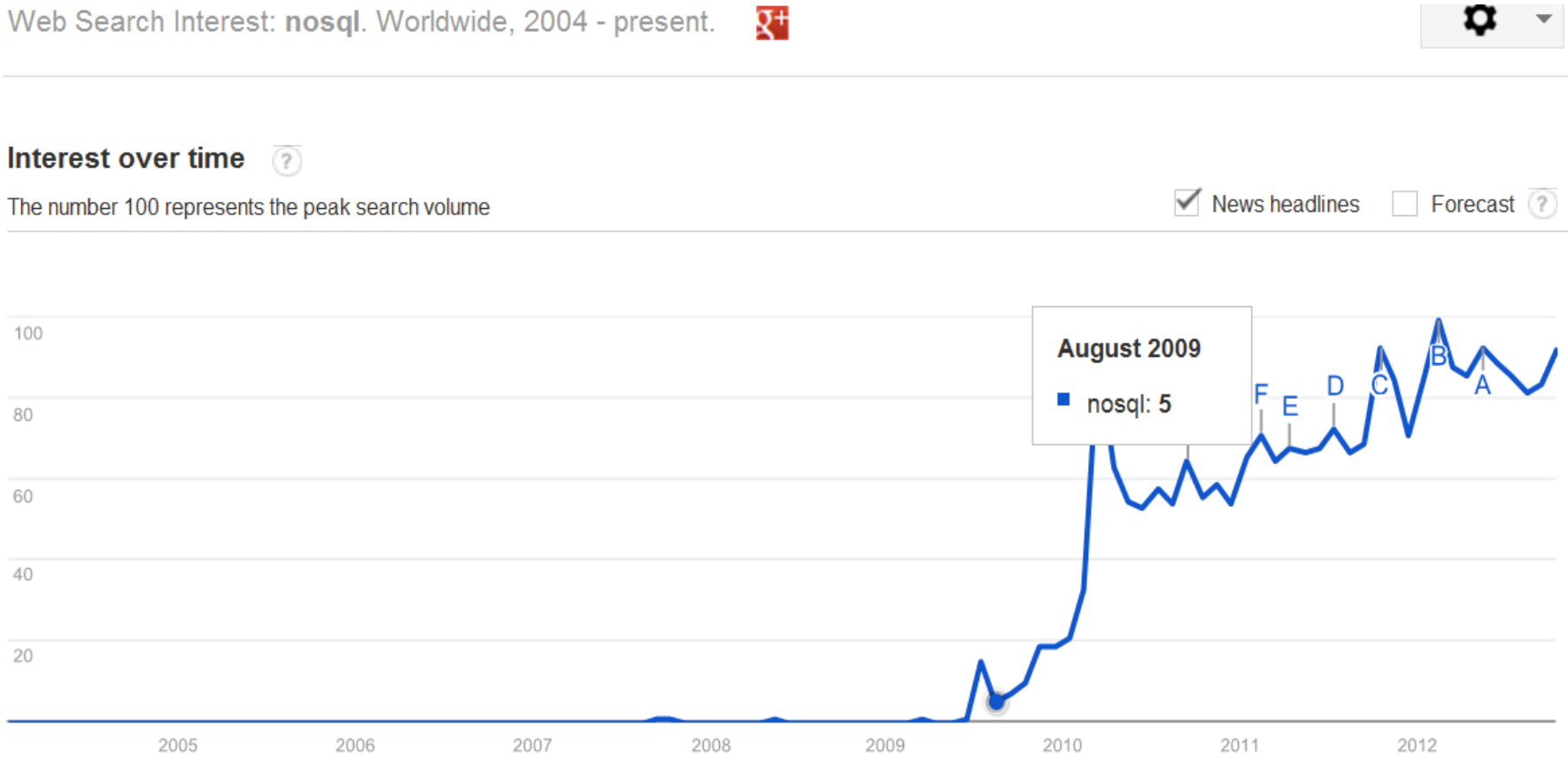
**Big Data Governance:** An Emerging Imperative

**Mastering Reference Data:** How Reference Data Management Fits into your Architectural Landscape

**Adopt a Smarter Approach to Managing Reference Data**

Center for Decision & Information Technologies
UNT

# NOSQL



Center for Decision & Information Technologies
UNT

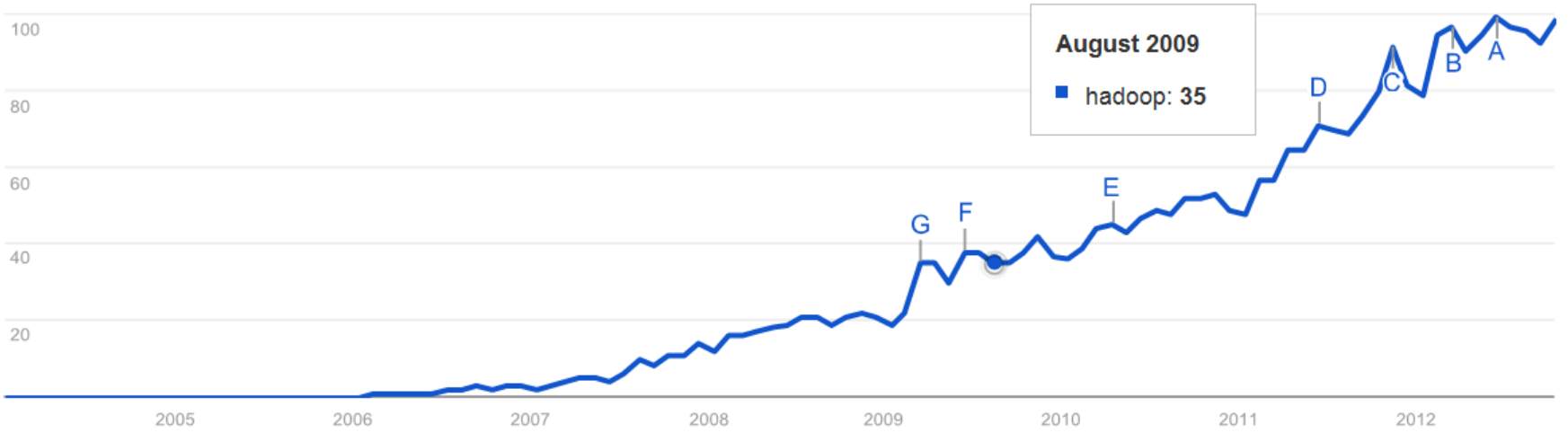
# HADOOP

Web Search Interest: **hadoop**. Worldwide, 2004 - present.

**Interest over time**

The number 100 represents the peak search volume

News headlines  Forecast



Center for Decision & Information Technologies UNT

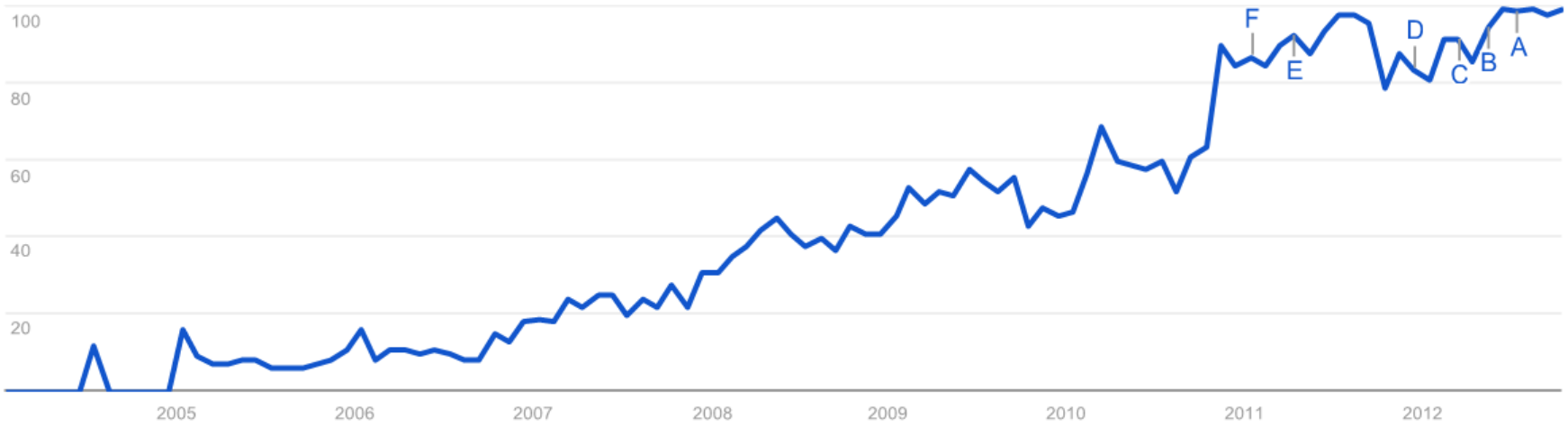
# H Base

Web Search Interest: **hbase**. Worldwide, 2004 - present.

**Interest over time**

The number 100 represents the peak search volume

News headlines  Forecast



Center for Decision & Information Technologies
UNT

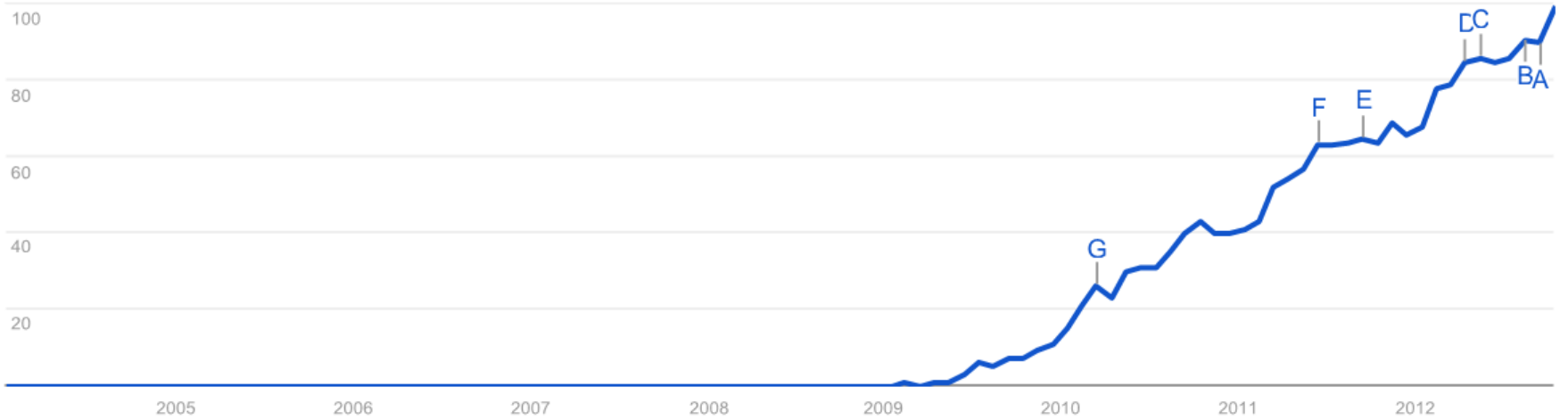
# MONGODB

Web Search Interest: **mongodb**. Worldwide, 2004 - present.

**Interest over time**

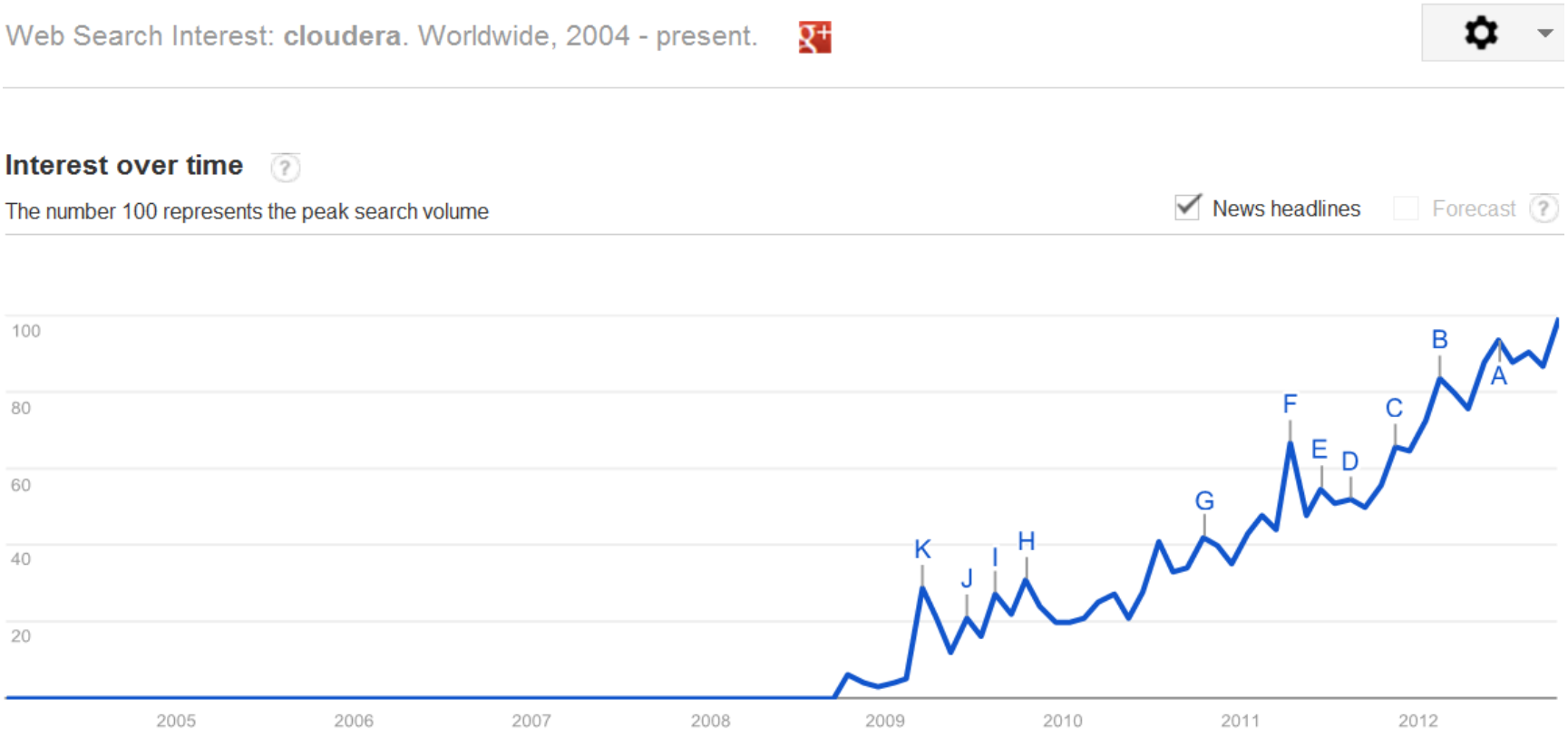
The number 100 represents the peak search volume

News headlines  Forecast



Center for Decision & Information Technologies
UNT

# CLOUDERA



Center for Decision & Information Technologies UNT

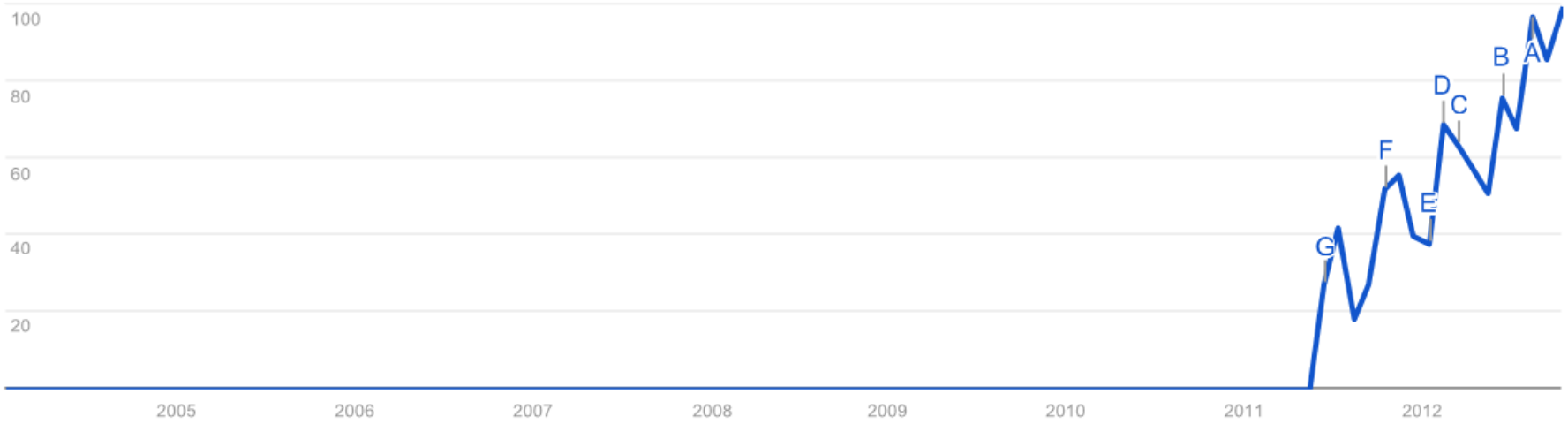
# HortonWorks

Web Search Interest: **hortonworks**. Worldwide, 2004 - present.

**Interest over time**

The number 100 represents the peak search volume

News headlines  Forecast



Center for Decision & Information Technologies
UNT

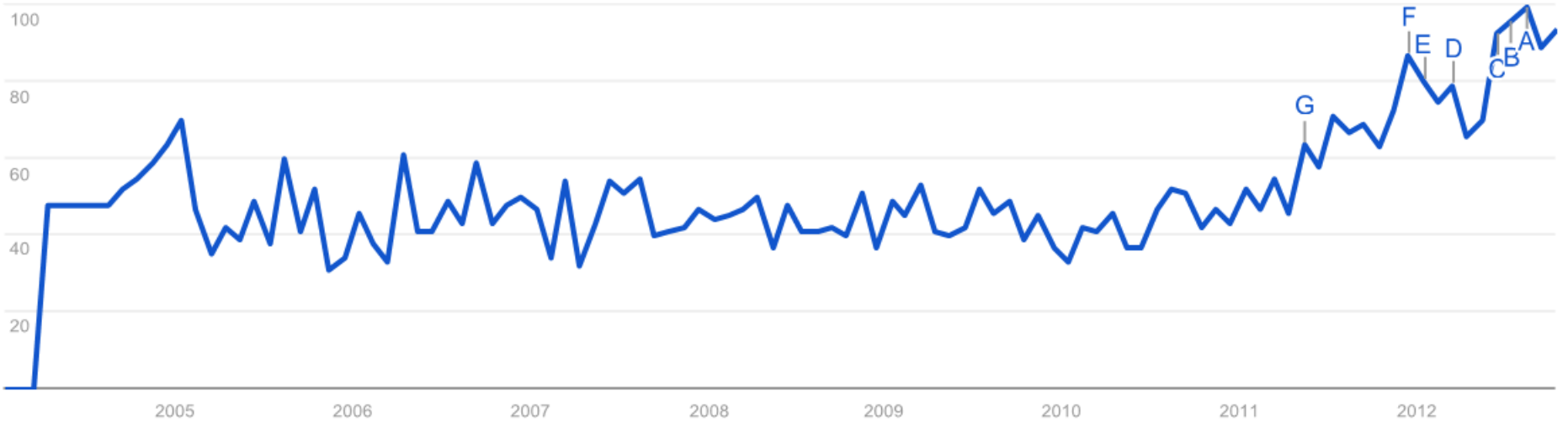
# MAPR

Web Search Interest: **mapr**. Worldwide, 2004 - present.

**Interest over time**

The number 100 represents the peak search volume

News headlines  Forecast



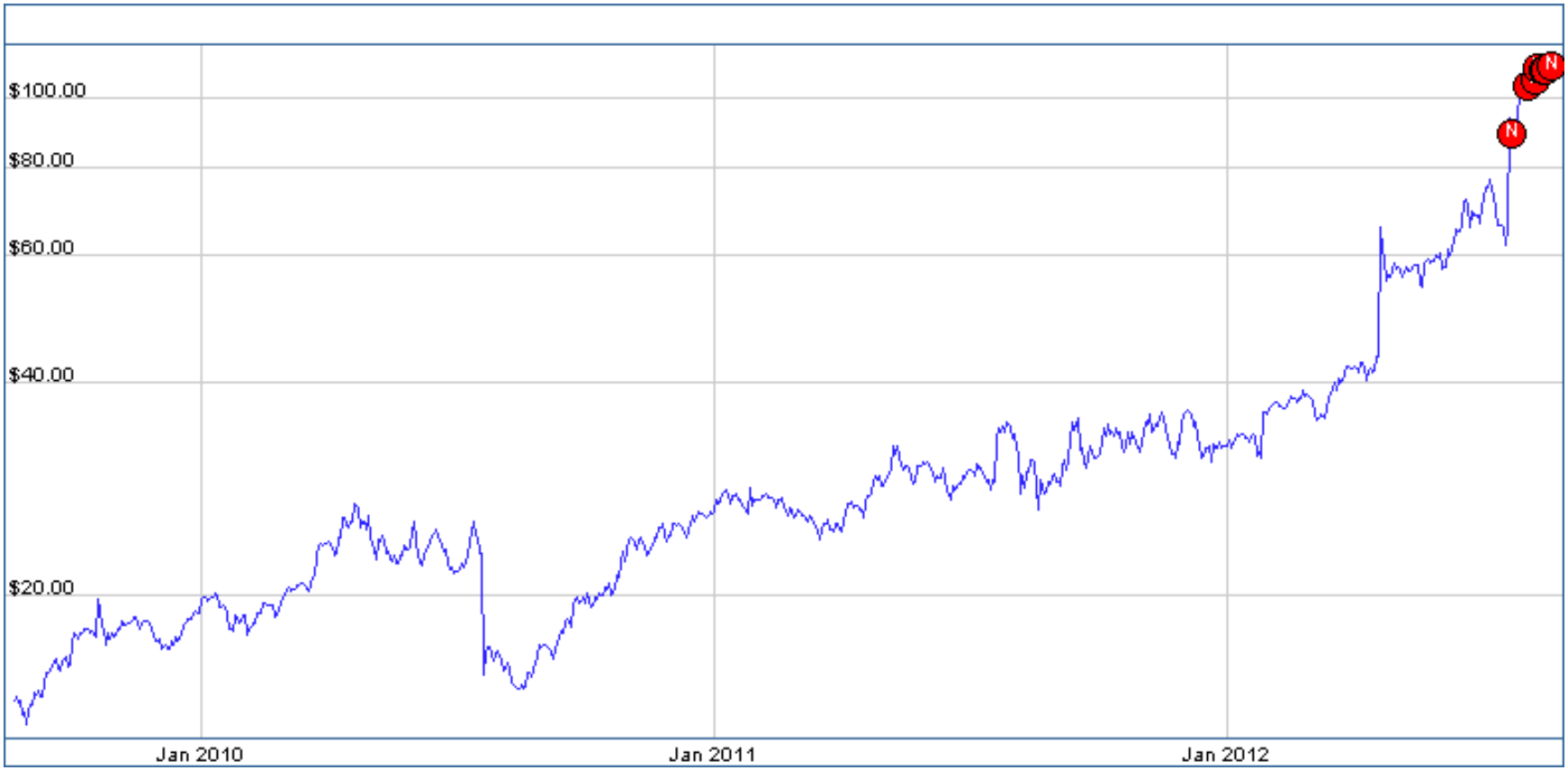
Center for Decision & Information Technologies UNT

# Melanox

Mellanox Technologies, Ltd. (Mellanox) is a fabless semiconductor company that produces and supplies interconnect products that facilitate data transmission between servers, storage systems and communications infrastructure equipment and other embedded systems. The Company's end-to-end solutions, including adapter, gateway and switch integrated circuits (ICs), adapter cards, switch systems, gateway systems, software, services and cables are an integral part of a total interconnect solution focused on computing, storage and communication applications used in multiple markets, including high-performance computing (HPC), Web 2.0, storage, financial services, database and cloud. On February 7, 2011, Mellanox acquired Voltaire Ltd. (Voltaire). In April 2011, the Company introduced the SwitchX family of switch ICs, which incorporates Virtual Protocol Interconnect (VPI) technology.

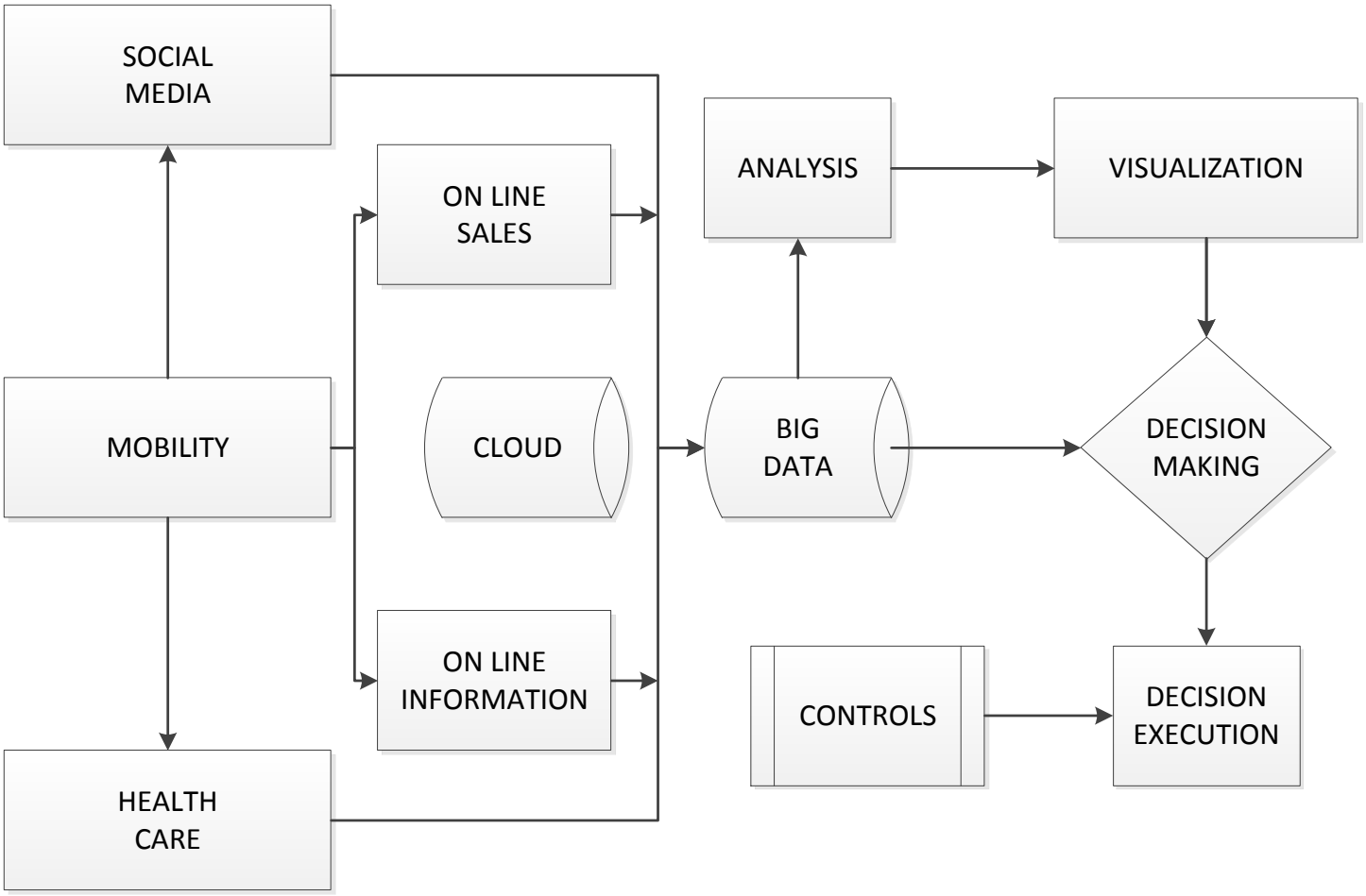
Center for Decision & Information Technologies

# Melanox



Center for Decision & Information Technologies
UNT

# Context



Center for Decision & Information Technologies
UNT

# Aircraft Control

Center for Decision & Information Technologies
UNT

# The Driverless Road Ahead

## Carmakers are starting to take autonomous vehicles seriously!

Center for Decision & Information Technologies UNT

# Business Intelligence (BI)

- This area has really taken off and major technology firms (IBM, Oracle, SAS, HP, SAP, Microsoft etc.) have purchased smaller providers of methodologies and tools. A major consolidation has taken place; but more firms have sprung up that address the front end of BI systems. The emphasis will shift from the database aspect of BI to the Decision Making focus. This shift has driven new concepts and software.

Center for Decision & Information Technologies UNT

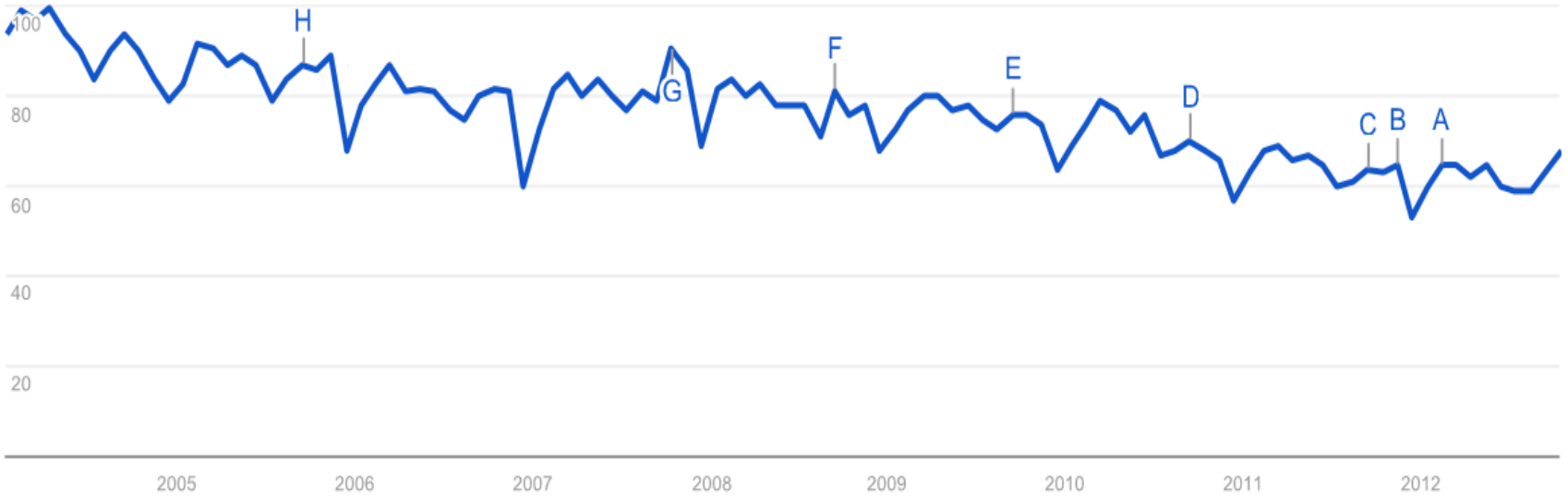
# Business Intelligence Trends

Web Search Interest: **business intelligence**. Worldwide, 2004 - present.

**Interest over time**

The number 100 represents the peak search volume

News headlines  Forecast



Center for Decision & Information Technologies UNT

# Analytics Usage Will Continue to Expand

The demand for tools from companies such as SAS, HP, SPSS (IBM), Minitab, Excel and other niche (and growing)supporting software will continue to expand; along with a demand for personnel to utilize these tools in a decision analysis context. This will now include the move toward more visualization, graphic presentation and "data exploration". As we generate more data there will be growing emphasis on data, text and video mining. Also driving this is **e-discovery**; which will be a force in the coming years and may deserve to be a category by itself. . Currently many providers of SaaS are using analytics as a competitive tool. They provide feedback analytics on the services provided. These activities are turning into growing business opportunities – see "Building Businesses with Databases" in this forecast.

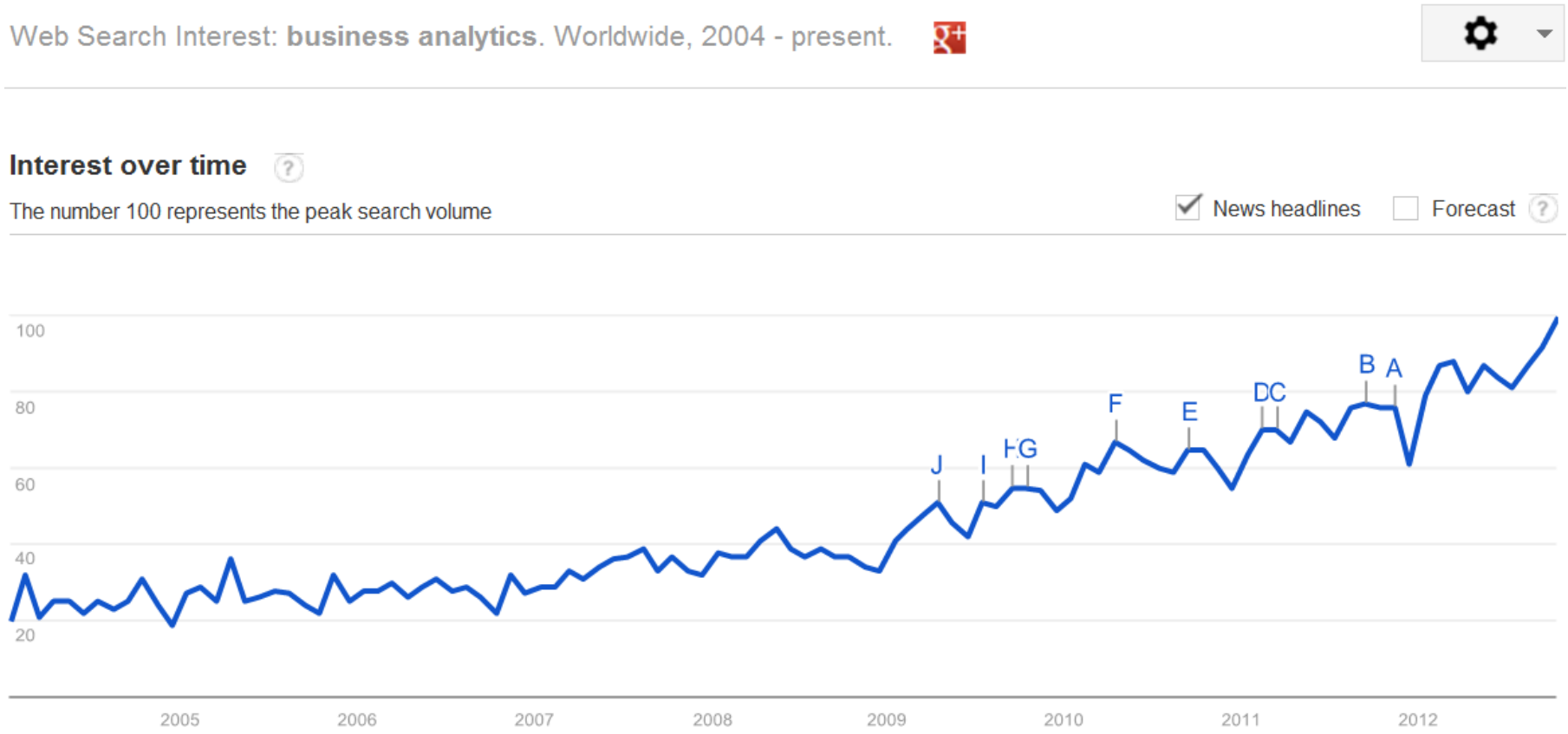
Center for Decision & Information Technologies

# Chief Customer Officer

Brett Ryder

Center for Decision & Information Technologies
UNT

# BUSINESS ANALYTICS TRENDS



Center for Decision & Information Technologies

# Chief Analytic Officer

Center for Decision & Information Technologies UNT

# Predictive Analytics

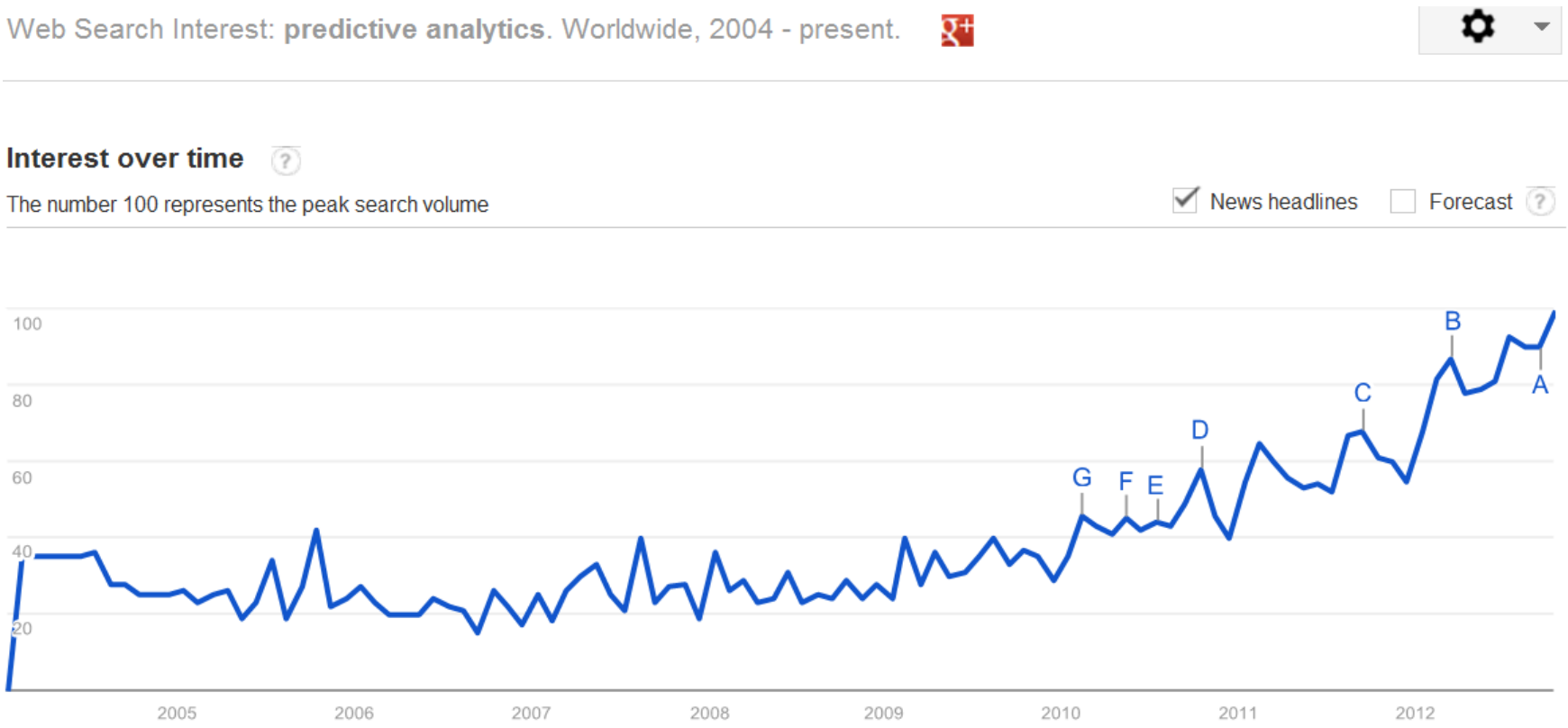
"**Predictive Analytics (2010)**Encompasses a variety of techniques from statistics, data mining and game theory [also modeling]; that analyze current and historical facts {data} to make predictions about future events"* This area will continue to expand rapidly due to support software developments and the focus on risk assessment/abatement."

**"Predictive analytics (2012)** encompasses a variety of statistical techniques from modeling, machine learning, data mining and that analyze current and historical facts to make predictions about future events.[1][2]

In business, predictive models exploit patterns found in historical and transactional data to identify risks and opportunities. Models capture relationships among many factors to allow assessment of risk or potential associated with a particular set of conditions, guiding decision making for candidate transactions."

Center for Decision & Information Technologies
UNT

# Predictive Analytics



Center for Decision & Information Technologies UNT

# Election Analytics and Big Data

- Big Data Chases Election 2012 Undecided Voters
- Here's a look inside how campaigns use online advertising agencies that apply advanced analytics to reach undecided voters.

**Jeff Bertolucci** InformationWeek
October 22, 2012 10:55 AM

Center for Decision & Information Technologies
UNT

# COMPLEX EVENT PROCESSING

“Primarily an event processing concept that deals with the task of processing multiple events with the goal of identifying the meaningful events within the event cloud. CEP employs techniques such as detection of complex patterns”. *In the drive to assess risk more quickly (more accurately has yet to be seen) methodologies and software tools have developed to handle large amounts of analysis quickly. This software depends greatly on pattern matching; but will continue to evolve and will become part of predictive analytics.

Center for Decision & Information Technologies
UNT

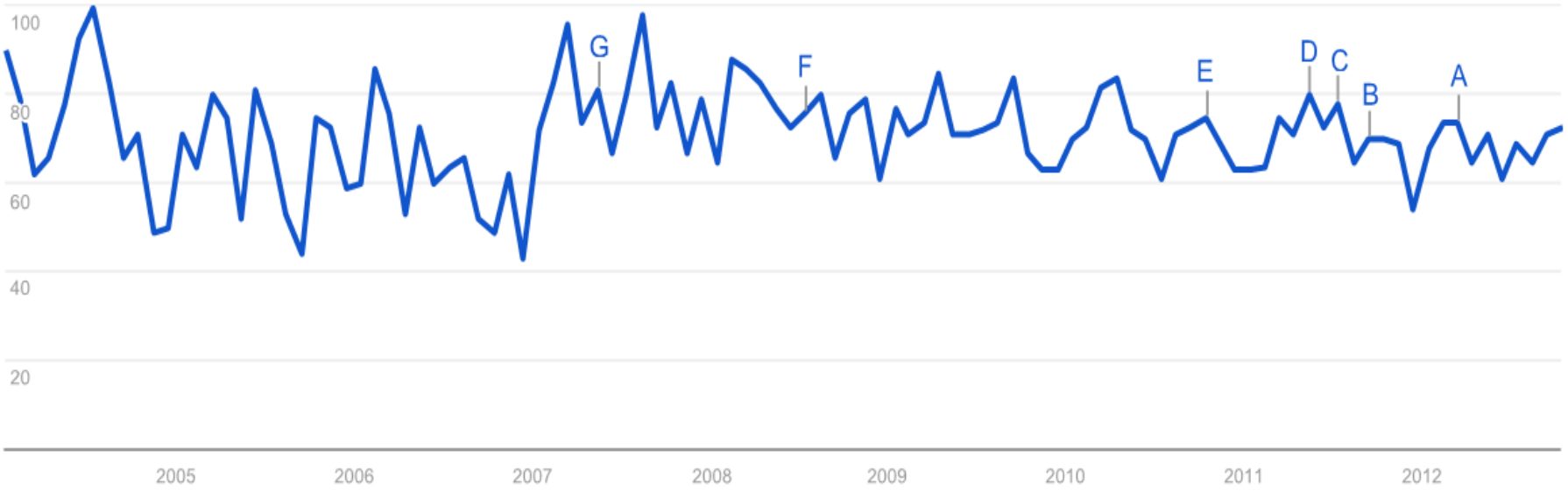
# EVENT PROCESSING

Web Search Interest: **event processing**. Worldwide, 2004 - present.

## Interest over time

The number 100 represents the peak search volume

News headlines  Forecast



## Salesforce Marketing Cloud Adds Social Analytics Options

Klout, Kred, OpenAmplify, and 17 other partners help Salesforce Marketing Cloud customers make sense of social networks.

By **Doug Henschen** InformationWeek

October 19, 2012 11:06 AM

Center for Decision & Information Technologies
UNT

# IN DATABASE ANALYTICS

Driven by the need for speed. This methodology allows developers to move the computational operations into the data warehouse, doing away with data movement and taking advantage of parallel processing capabilities; thus contributing greatly to shortened time frames for computing and efficiency. This trend will continue to grow as we accumulate more data and work on reducing lag times

Center for Decision & Information Technologies UNT

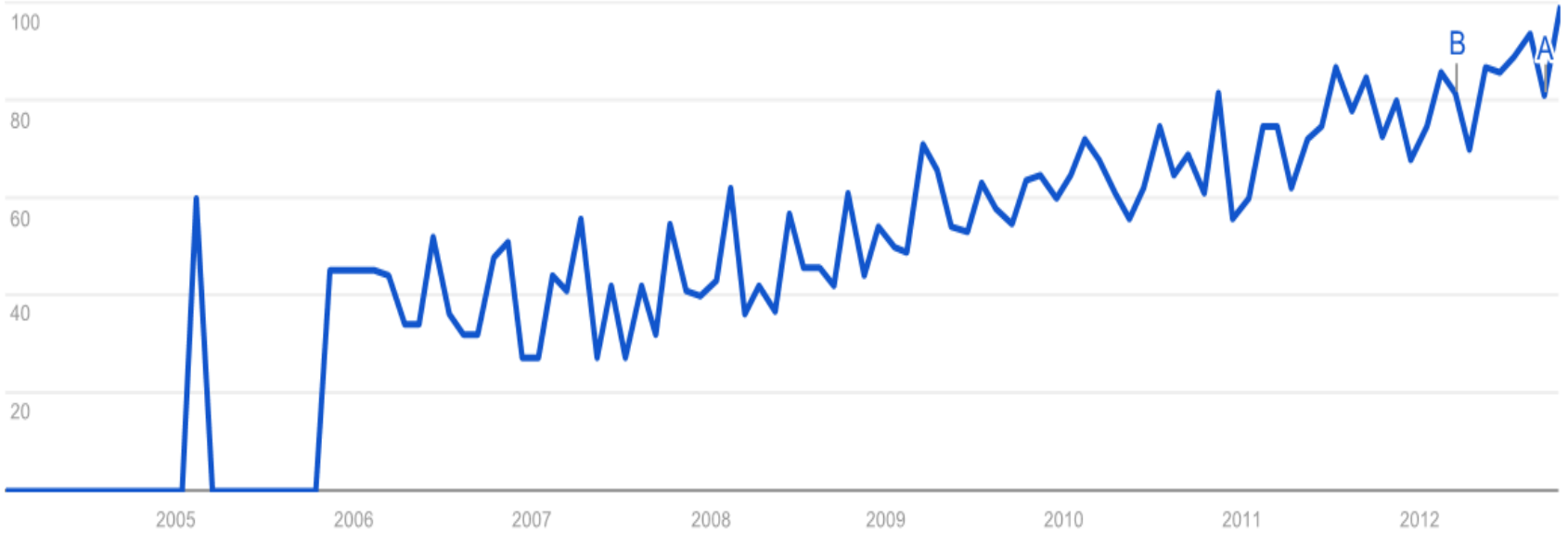
# Database Analytics

Web Search Interest: **database analytics**. Worldwide, 2004 - present.

## Interest over time

The number 100 represents the peak search volume

News headlines  Forecast

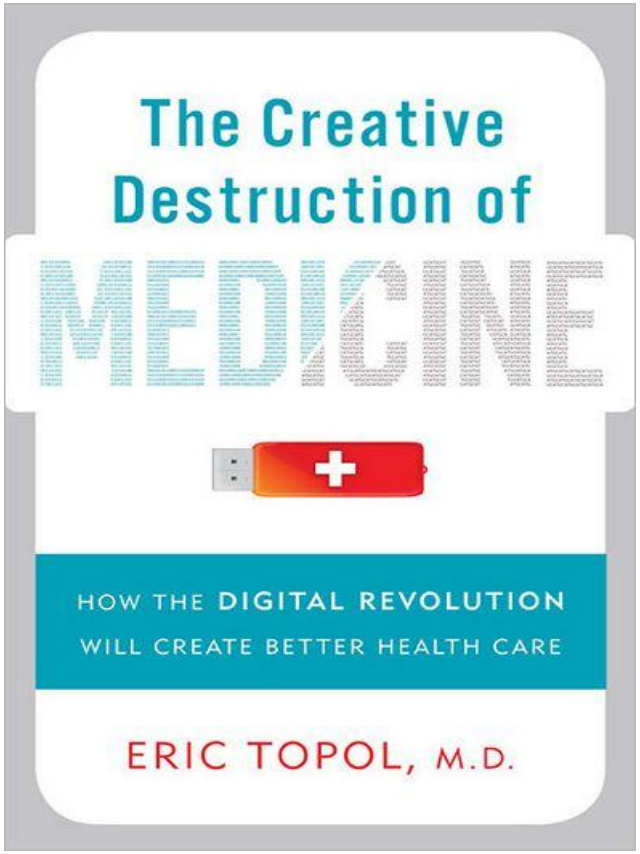


Center for Decision & Information Technologies

# The coming convergence of wireless communications, social networking and medicine will transform health care*

Center for Decision & Information Technologies
UNT

# Bringing Medical & Databases Together (2012)

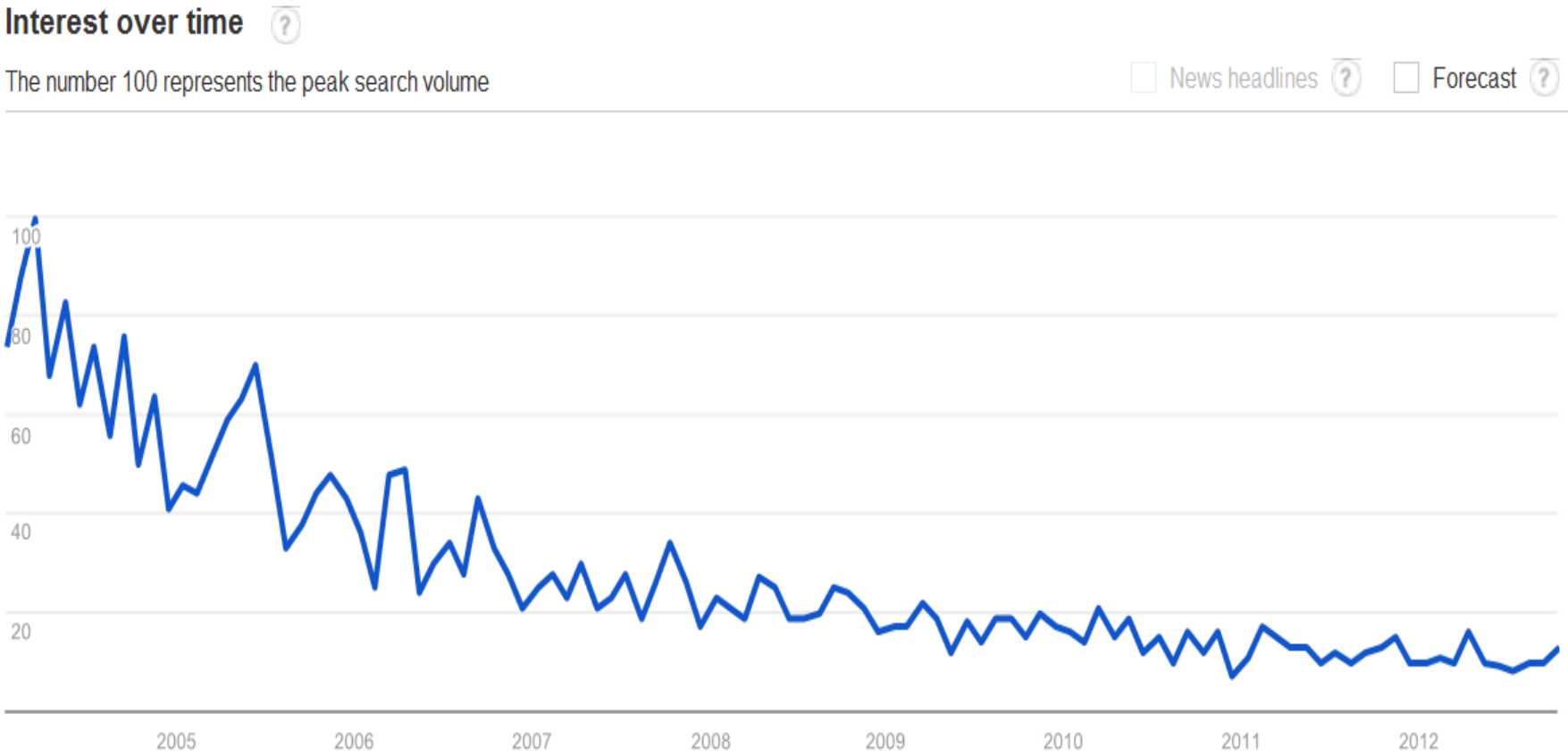


# Analytics & Healthcare

- Supercomputer Speeds Up Cancer Analysis
- Supercomputer dramatically reduces time required to analyze tumor cells, promising to bring genomic medicine to the bedside.
  By **Nicole Lewis** InformationWeek
  October 11, 2012 10:16 AM
- By marrying good science to a supercomputer, researchers have found a way to do the genomic analysis of a cancer tumor, a process that once took 8 weeks, in just 47 seconds per patient. The news could for the first time give oncologists critical information about the cancer they are going to treat before they begin treatment.

# Medical Databases

Web Search Interest: **medical databases**. Worldwide, 2004 - present.



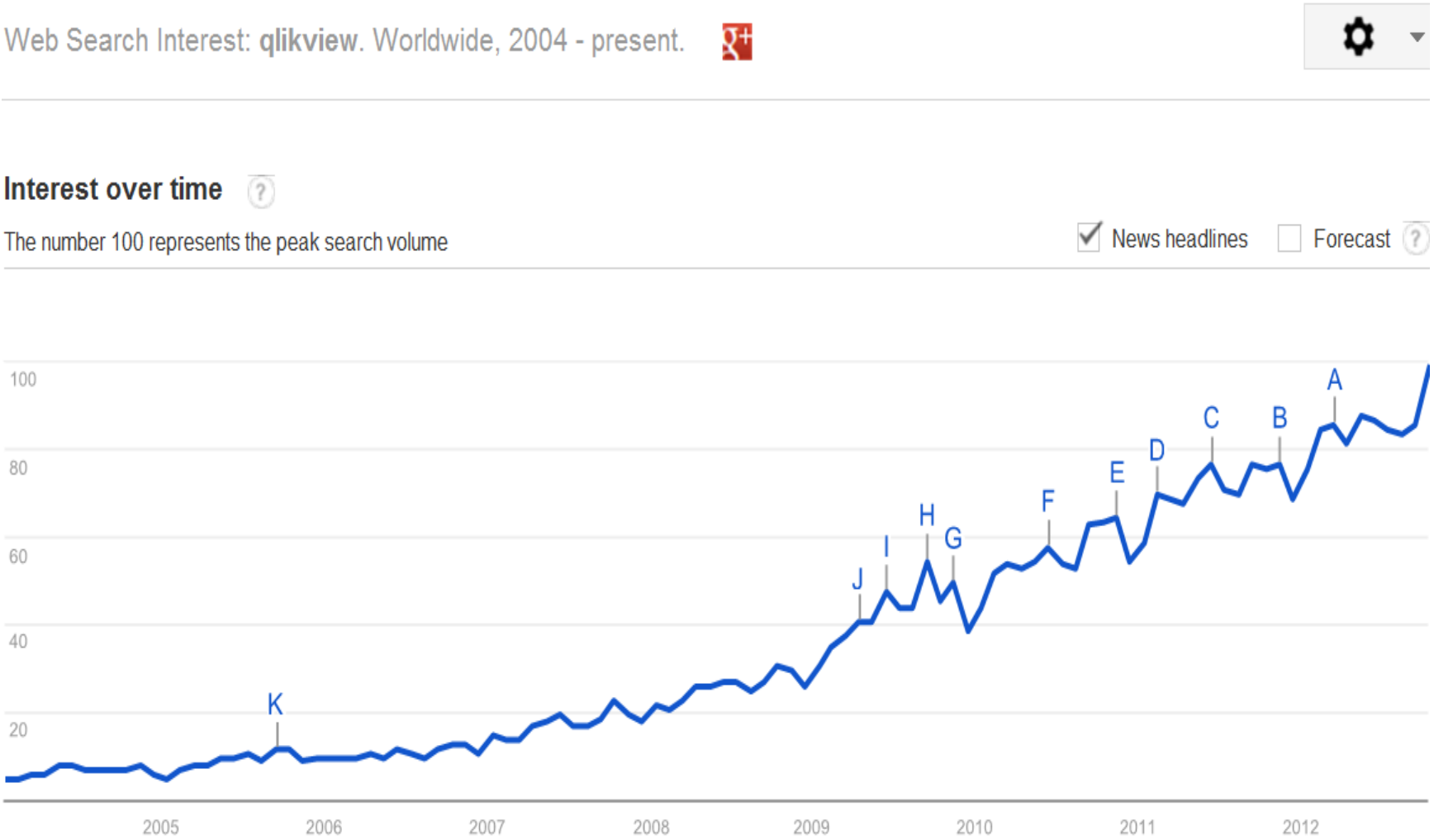
Center for Decision & Information Technologies
UNT

# Visualization & Exploration

- **Data visualization** is the study of the visual representation of data, meaning "information that has been abstracted in some schematic form, including attributes or variables for the units of information".[1]
- E**xploratory data analysis (EDA)** is an approach to analyzing data sets to summarize their main characteristics in easy-to-understand form, often with visual graphs, without using a statistical model or having formulated a hypothesis. Exploratory data analysis was promoted by John Tukey to encourage statisticians visually to examine their data sets, to formulate hypotheses that could be tested on new data-sets.

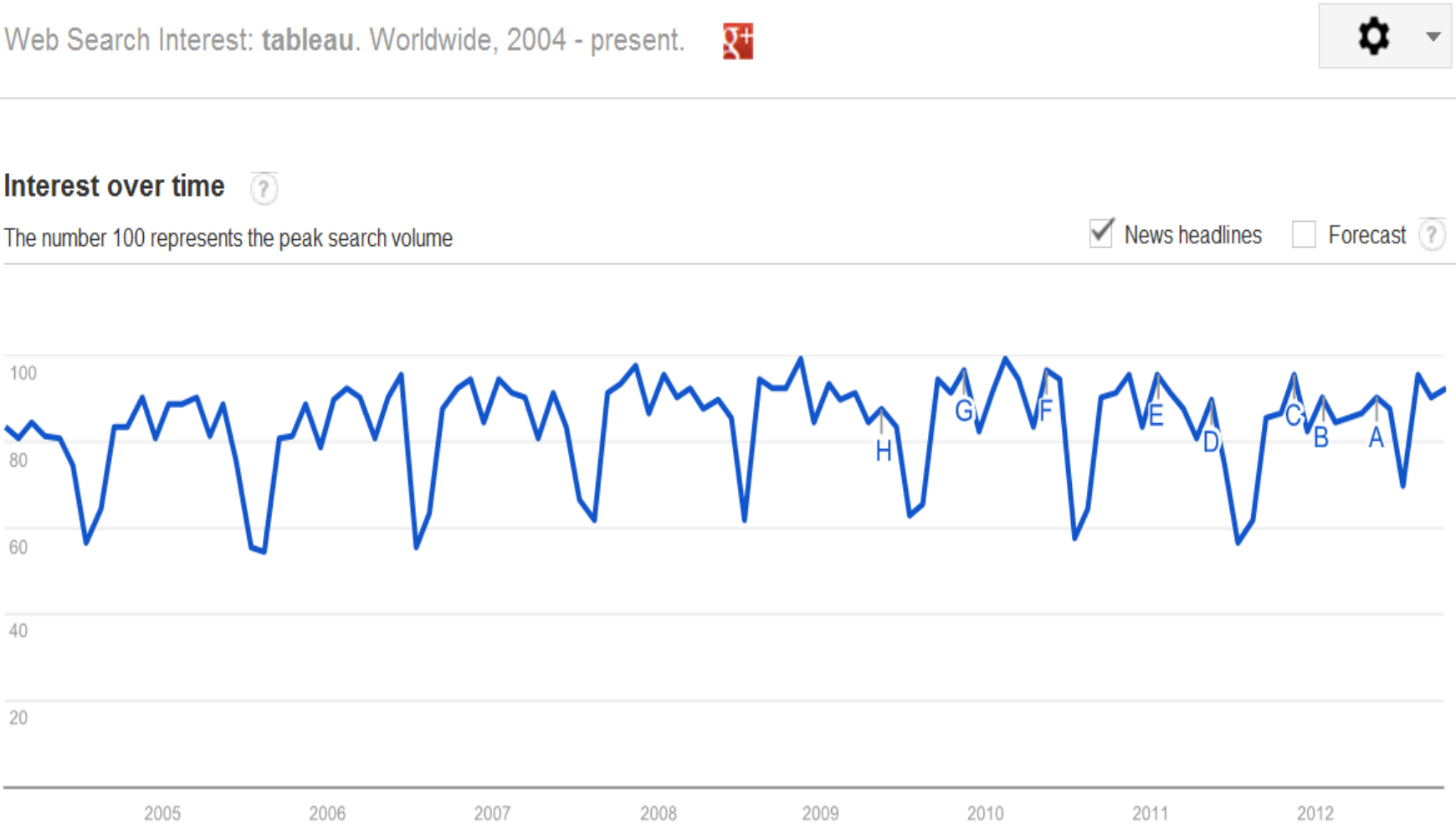
Center for Decision & Information Technologies

# Visualization
# Qlikview



Center for Decision & Information Technologies
UNT

# Visualization
# Tableau



Center for Decision & Information Technologies UNT

# Security, Fraud & Cyber Warfare

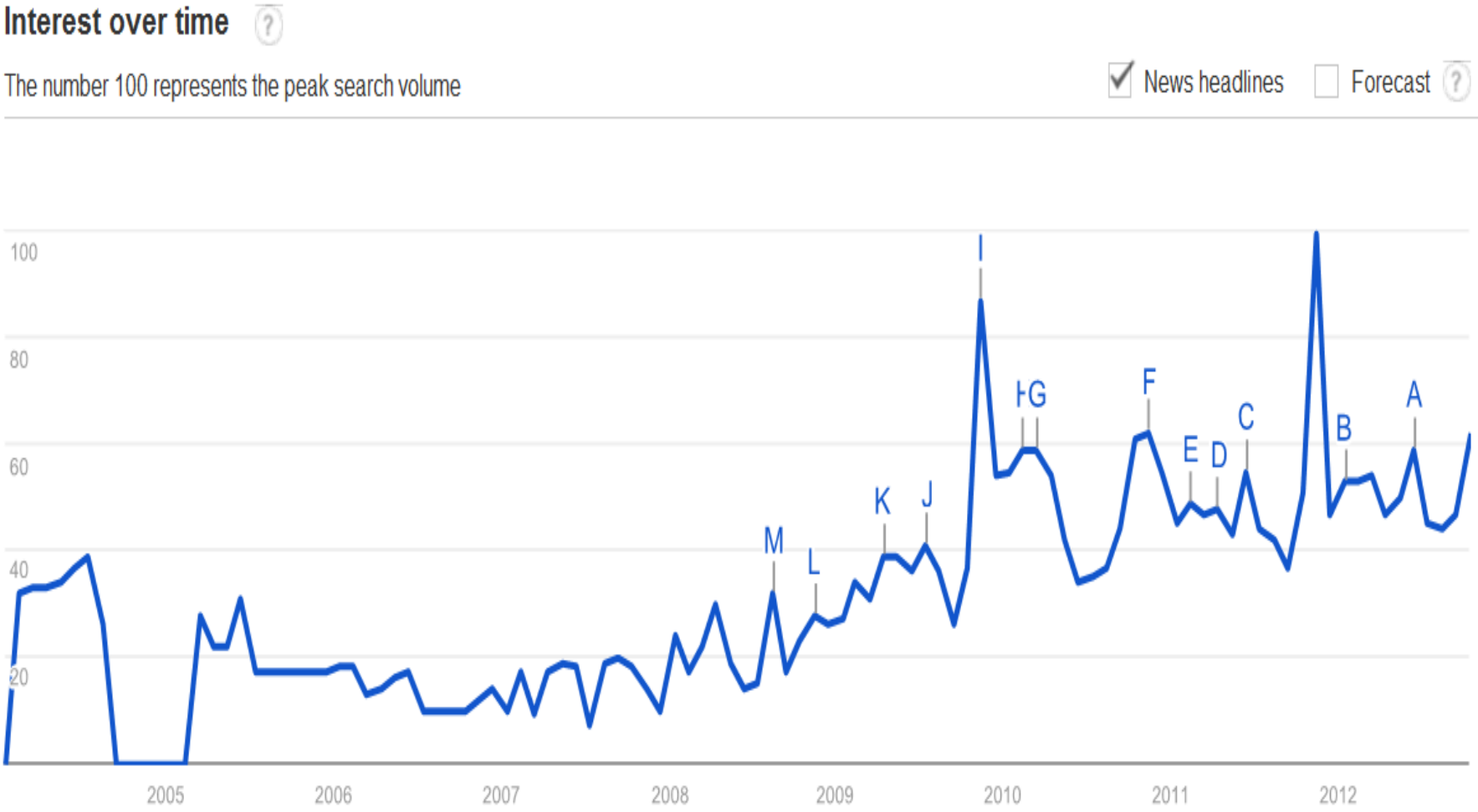
**Cyberwarfare (2010)** has been defined by government security expert Richard A. Clarke, in his book *Cyber War* (May 2010), as "actions by a nation-state to penetrate another nation's computers or networks for the purposes of causing damage or disruption."[1]:6 The *Economist* describes cyber warfare as *"the fifth domain of warfare, after land, sea, air and space*".[2]*

**Cyberwarfare (2012)** refers to politically motivated hacking to conduct sabotage and espionage. It is a form of information warfare sometimes seen as analogous to conventional warfare[1] although this analogy is controversial for both its accuracy and its political motivation.

U.S. government security expert Richard A. Clarke, in his book *Cyber War* (May 2010), defines "cyberwarfare" as "actions by a nation-state to penetrate another nation's computers or networks for the purposes of causing damage or disruption."[2]:6 The *Economist* describes cyberspace as "the fifth domain of warfare,"[3] and William J. Lynn, U.S. Deputy Secretary of Defense, states that "as a doctrinal matter, the Pentagon has formally recognized cyberspace as a new domain in warfare . . . [which] has become just as critical to military operations as land, sea, air, and space."[4]

Center for Decision & Information Technologies
UNT

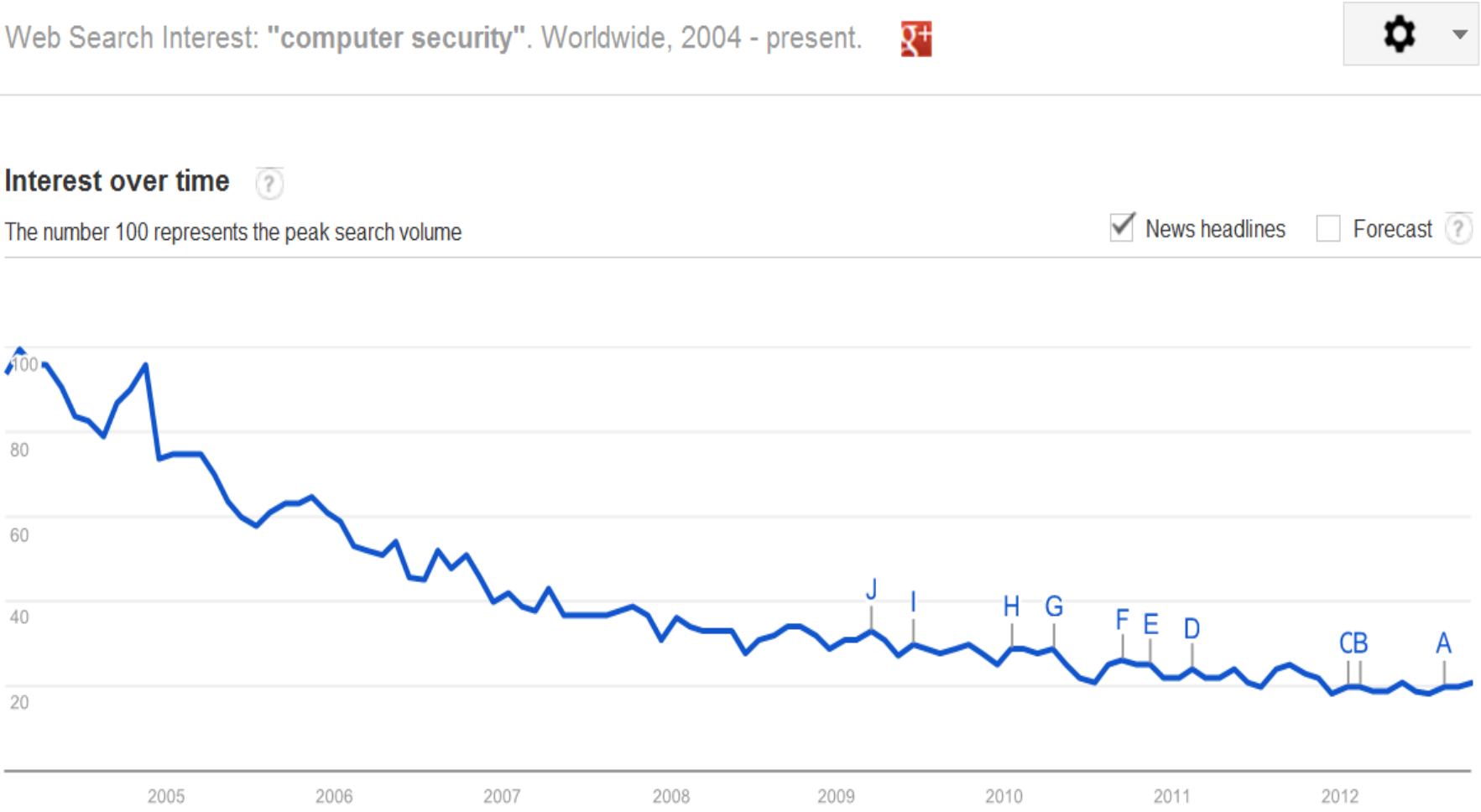
# Cyber Warfare



Center for Decision & Information Technologies
UNT

# Computer Security

Web Search Interest: **"computer security"**. Worldwide, 2004 - present.



Center for Decision & Information Technologies
UNT

# Security, Fraud & Cyber Warfare

- **Vulnerability and Security Assessments**
- Physical and Information Security Assessments
- Software Vulnerability Testing
- Penetration Testing
- Certification and Accreditation
- Compliance and Security Audits
- **Enterprise Information Assurance (IA) Solutions and Services**
- Cross-Domain Information Sharing
- Multiple-Domain Information Sharing
- Perimeter Defense
- Public Key Infrastructure (PKI)
- Security Architectural Engineering and Systems Integration
- IA Training
- **Monitoring and Traffic Analysis**
- Secure Voice/Video/Data Communications
- Endpoint and Network Monitoring
- Insider Threat Protection
- Real-time Network Traffic Intelligence
- **Information Services**
- Cryptographic Solutions

Center for Decision & Information Technologies UNT

# Building Businesses with Databases, Analytics and Research: The New SaaS

With the servicing of many corporate needs via web based programs (everything from job sites to strategy analyses), wireless communication, social networking etc., the data amassed and held by different firms gives them a substantial opportunity to provide analyses based on the data that they hold in their databases. As SaaS grows the potential to build data that will enhance the future delivery of multiple services grows. "My database has the data and I have the analytic talent to deliver projects against your data; without adding to your staff." This trend has so many different convergences with other technologies it is difficult to enumerate them; but it will have a substantial impact on the analytic services industry going forward.

Center for Decision & Information Technologies UNT

# Data Bases - Individuals

- **Welcome to Patients Know Best**

We put patients in control of their medical records

Everyone benefits, including clinicians, researchers and charities

We are a social enterprise, and our mission is that *patients know best*

- http://www.patientsknowbest.com/

Center for Decision & Information Technologies
UNT

# New Business

Big Data App Store Opens For Business

Datameer analytic applications market lets data scientists, subject matter experts sell analytic apps directly to end users.

Analytics software developer Datameer has launched the world's first app market designed specifically for big data applications. The Datameer Analytic Applications Market allows users of the company's Hadoop-based analytics tools to buy and sell apps created with Datameer 2.1, the latest version of company's spreadsheet-based development tool.

Center for Decision & Information Technologies
UNT

# New Business

Big Data Tackles Classic Question: What's The Weather Forecast?

Startup takes 60+ years of historical weather data, crunches it with 82 billion calculations to make more accurate long-term forecasts.

Predicting the weather more than 10 days in advance has long been more art than science. But a San Diego-based startup says it can predict extreme weather conditions, such as severe winter cold spells and searing summer heat, up to 40 days in advance with a 70% accuracy rate.

Center for Decision & Information Technologies UNT

# Information Technology & Decision Sciences
# University of North Texas - MS

DSCI 5240 Data-Based Decision Support Systems (Data Mining)

DSCI 5330 Enterprise Applications of Business Intelligence

DSCI 5340 Predictive Analytics and Business Forecasting

DSCI 5350 Big Data Analytics - Fall 2013

DSCI ???? Analytics of Data Visualization & Exploration (2014)

# Information Technology & Decision Sciences
# University of North Texas - BBA

- **DSCI 2710 (Business Stats I)**
- **DSCI 3710 (Business Stats II)**

- **DSCI 3870 (Management Science)**
- **DSCI 4510 (Model-based Decision Support Systems)**
- **DSCI 4520 (Data-based Decision Support Systems**
- **DSCI 4700 (Problem Solving and Decision Making Process)**

- **BCIS 4660 (Decision Software Design)**
- **MGMT 3830 (Operations Management)**

- **Approved Supporting Courses (12 semester hours)**
- **We require the students to choose a functional area, outside of Decision Sciences, so they will have grounding in a functional area of their choice. This requires 12 semester hours of upper division course work in that functional area; to include one international course. Our students have completed these hours in everything in business like finance or marketing to other fields; such as geography (GIS) to math(for actuarial analysis).**

Center for Decision & Information Technologies

# AND NOW

??????????????????????