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NEWS-LETTER FROM INFORMATION TECHNOLOGY,
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“Education without values, as useful as it is, seems rather to make man a more clever devil.”

- C.S. Lewis

“Educating the mind without educating the heart is no education at all.”

- Aristotle

“Students must be taught how to think, not what to think.”

-Margaret Mead

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STUDENT COLUMN

Oracle NoSQL Database
By-Mounika.R

Why use a NoSQL database ??

Relational databases enforce ACID. So, you will have schema based transaction oriented data stores. It's proven and suitable for 99% of the real world applications. You can practically do anything with relational databases.

But, there are limitations on speed and scaling when it comes to massive high availability data stores. For example, Google and Amazon have terabytes of data stored in big data centers. Querying and inserting is not performed in these scenarios because of the blocking/schema/transaction nature of the RDBMs. That's the reason they have implemented their own databases (actually, key-value stores) for massive performance gain and scalability.

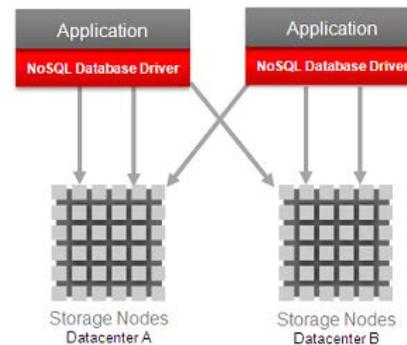
NoSQL databases have been around for a long time - just the term is new. Some examples are graph, object, column, XML and document databases.

What is a NoSQL database?

The Oracle NoSQL Database is a distributed key-value database. It is designed to provide highly reliable, scalable and available data storage across a configurable set of systems that function as storage nodes.

Data is stored as key-value pairs, which are written to particular storage node(s), based on

the hashed value of the primary key. Storage nodes are replicated to ensure high availability, rapid failover in the event of a node failure and optimal load balancing of queries. Customer applications are written using an easy-to-use Java API to read and write data. The NoSQL Database links with the customer application, providing access to the data via the appropriate storage node for the requested key-value.



The NoSQL Database intelligent driver includes the hashing algorithms to ensure proper data distribution, as well as state and performance information about each storage node which enable it to provide optimal load balancing and query processing. The NoSQL Database provides easy administration via either a web console or command line interface.

Key Features

The Oracle NoSQL Database includes the following key features:

- Simple Data Model
- Key-value pair data structure, keys are composed of Major & Minor keys
- Easy-to-use Java API with simple Put, Delete and Get operations
- Scalability
- Automatic, hash-function based data partitioning and distribution
- Intelligent NoSQL Database driver is topology and latency aware, providing optimal data access
- Predictable behavior

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- ACID transactions, configurable globally and per operation
- Bounded latency via B-tree caching and efficient query dispatching
- High Availability
- No single point of failure
- Built-in, configurable replication
- Resilient to single and multi-storage node failure
- Disaster recovery via data center replication
- Easy Administration
- Web console or command line interface
- System and node management
- Shows system topology, status, current load, trailing and average latency, events and alerts

Many IT shops are still evaluating moving from SQL Server 2000 to SQL Server 2005, much less these non-relational databases. A lot of people don't even know what they would use a NoSQL database for. Does it replace the RDBMS? Work alongside it? Do something else?

1) Analytics

One reason to consider adding a NoSQL database to your corporate infrastructure is that many NoSQL databases are well suited to performing analytical queries. Developers can use the same querying languages to perform analytical queries that they're using to perform atomic queries. Typically this will be some variation of a MapReduce query, but it's also possible to query data using Pig or Hive. Don't worry too much about these weird language terms, MapReduce is a fancy way of saying "SELECT and then GROUP BY" and doing it in a way that is entirely confusing to people who are used to SQL.

Many NoSQL systems boast phenomenal write performance. When you combine high write performance with batch processing it is easy to

pre-aggregate data, summarize results, and still guarantee ad hoc query performance.

2) Scale

NoSQL databases are designed to scale; it's one of the primary reasons that people choose a NoSQL database. Typically, with a relational database like SQL Server or Oracle, you scale by purchasing larger and faster servers and storage or by employing specialists to provide additional tuning. Unlike relational databases, NoSQL databases are designed to easily scale out as they grow. Data is partitioned and balanced across multiple nodes in a cluster, and aggregate queries are distributed by default. Scaling is as easy as racking a new server and executing a few commands to add the new server to the cluster (yeah, it really is that easy). Data will start flowing and you'll be back in business in no time.

3) Redundancy

In addition to rapid scaleability, NoSQL databases are also designed with redundancy in mind. These databases were designed and built at massive scales where the rarest hardware problems go from being freak events to eventualities. Hardware will fail. Rather than treat hardware failure as an exceptional event, NoSQL databases are designed to handle it. While hardware failure is still a serious concern, this concern is addressed at the architectural level of the database, rather than requiring developers, DBAs, and operations staff to build their own redundant solutions. Cassandra uses a number of heuristics to determine the likelihood of node failure. Riak takes a different approach and can survive network partitioning (when one or more nodes in a cluster become isolated) and repair itself.

4) Flexibility

What's the use of a database if it's not flexible? While the data modeling issues are completely

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different in NoSQL, there is a large amount of flexibility in how data is stored for performance. Databases modeled like Bigtable and Cassandra provide flexibility around how data is stored on disk. It's possible to create derived column families. In plain English: you can design your database to duplicate frequently accessed data for rapid query response. This is, of course, based on the assumption that writes and storage space are cheap.

Databases based on the Bigtable model also have another benefit – outside of key structure it's possible to store a variety of disparate data in the same table. Structure is largely irrelevant. Relational databases have adopted features to solve similar problems (such as sparse columns in SQL Server), but they carry overhead. Storing wildly different columns in multiple rows of the same column family is so cheap as to be invisible in a NoSQL database. Lastly, key-value stores provide an incredible level of flexibility. Data is arbitrarily stored as a value. Key-value databases make it possible to store images, word documents, strings, integers, and serialized objects within the same database. This requires more responsibility and creative thinking on the part of application developers and architects but it also lets the people designing the system build custom a completely custom solution that fills their needs.

5) Rapid Development

Everyone wants their application to be faster, have more features, and they want it yesterday. NoSQL databases make it easy to change how data is stored or change the queries you're running. Massive changes to data can be accomplished with simple refactoring and batch processing rather than complex migration scripts and outages and it's even easier to take nodes in a cluster offline for changes and add them back into a cluster as the new master server – replication features will take care of syncing up

data and propagating the new data design out to the other servers in a cluster.

The NoSQL ecosystem is still in its infancy, and many of the systems we've discussed will change architectures, designs, and interfaces. NoSQL leaves a lot of design work in the hands of the application designer. Understanding the architectural components of these systems will not only help you build the next great NoSQL amalgamation, but also allow you to use current versions responsibly.



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Dynamically Glare-Blocking LCD Sunglasses By-Mounika.R

Have you ever heard of sunglasses that block out points of bright light with LCD-screen lenses??

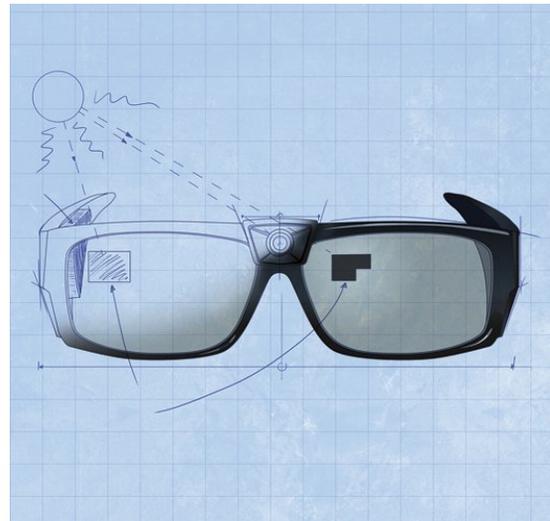
A bright, sunny day poses a threat to motorists if they're blinded by glare. But a new kind of sunglasses can do a lot to reduce that glare, thanks in part to Albert Titus, IEEE senior member and co-chair of the biomedical engineering department at the University of Buffalo, in New York. He has helped develop sunglasses with a twist: glare-blocking spots on the lenses that move with the wearer as his or her relation to the sun changes.

Chris Mullin, founder and chief executive officer of Dynamic Eye, in Pittsburgh, brought Titus in on his research team to develop battery-operated sunglasses equipped with components that detect glare and darken specific parts of the lens to block bright light. Although the high-tech shades are not ready for the market, they were named one of *Popular Science* magazine's top 10 inventions of the year.

How it works??

To create the sunglasses, the team used transparent LCD screens for the lenses. A small sensor was attached to the bridge of the glasses to monitor the user's line of vision. In addition, Titus helped design a glare-sensing chip, similar to a light meter in a handheld digital camera. When brightness has exceeded a certain threshold, the sensor triggers an adjacent microcontroller to darken specific pixels on the lens. A 4-by-6-millimeter rectangle is created that moves around each lens to block blinding

light as the wearer moves his or her head. The entire process—from image analysis to darkening the pixels—takes about 50 milliseconds.



He used a liquid crystal for the lens material. Although the visual properties of a liquid crystal can be electronically modified, the material can be as easy to see through as a typical sunglass lens. A small sensor on the nose bridge detects glare and alerts an adjacent microcontroller to its location. The microcontroller, in turn, instructs the liquid-crystal lens to display a four- or six-millimeter black square in front of the eye to block glare. The square moves with the wearer to block the source of glare at any angle but still allows the surroundings to remain visible

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GADGET CORNER

-Rohith Reddy.C

Pebble: A Watch That Syncs with Your Smartphone

We are head over heels in love with the Pebble. It's a watch, a smartphone satellite, and a sleek piece of arm candy all in one. As customizable as your trusty iPhone or Android, the Pebble is a watch designed with the 2.0 generation in mind. Best of all, it's on its way to becoming a reality thanks to Kickstarter!

First, how does it work? The Pebble connects to iPhone and Android smartphones using Bluetooth, alerting you with a silent vibration to incoming calls, emails, and messages. No more carrying your phone awkwardly everywhere you go (especially if you're a gal without pockets who doesn't feel like carrying a purse), and you can forget about being the rude dude who keeps his phone on the dinner table.

Plus, the display is made using electronic paper (similar to the Amazon Kindle) so it's totally readable in bright light, and avoids that piercing screen feeling you can get from looking at your phone too much. And if you do need to view it in low light, simply press the backlight just like a regular old digital watch!



Next, Pebble's got a whole host of apps. If you're a cyclist or runner, you can use Pebble to access the GPS on your phone to display speed, distance and pace data.



If you use your phone for music around the house, use the Pebble as a wrist-size remote control and skip over those Celine Dion tracks that always tend to show up when you choose *Shuffle All*.

And the Pebble is beautiful. With tons of digital watchfaces, the Pebble can be easily customized to your personality, mood, outfit, etc. It currently comes in Arctic White, Jet Black, and Cherry Red, and is compatible with any 22mm watch band. Its internal battery lasts up to 7 days, and it charges via USB on any computer.

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