IBM INFORMIX / OR: the good old rival of Oracle

Before we start, let's take a quick view on RDBMS'es just to be clear about how the Informix DB basically works.

RDBMS = relational database management system

RDBMS ist the most used version for database systems because the data structure is bound to a **scheme** or template what minimizes possible errors and makes complex data easier to read. Further in RDBMS the **ACID** is forced, what means the atomicity, consistency, isolation and durability of data is guaranteed. What makes it very useful for data which always follows the same rules.

But for the same reasons RDBMS is not so practicable for very large internet-data which is always varying or for frequent data migration as long as the data doesn't exactly fit the given scheme.

RDBMS is basically nothing more than a **collection of relations** or tables connected to each other. The whole system is based on relational algebra and we use **SQL** to define, query and manipulate the relations.

Each relation or table itself contains a bunch of **attributes** and **tuples** which are displayed as columns and rows.

Each table can have one or more **primary key** attributes to identify each tuple as also **foreign key** attributes to connect to other relations. And of course the **non-key** attributes.

That way each tuple represents one unique record.

Relational vs. Non-relational

A little example to understand the difference between relational and non-relational databases.

For a **restaurant** or a **bank** RDBMS would be really useful as there is a scheme, there is text and numbers, what means small data, always following the same routine. There is base data that is continuously used like prices or bank accounts.

But if you run a **food diary** e.g. on facebook or any other **blog** on social media you wouldn't get far with RDBMS because you will take pictures, maybe short video clips, which are larger files. Also you probably won't post the same food in the same version very often. So it is more useful to save every entry as a new document within a stack rather than in connected tables with base data.

But what if you do have very large data with a high manipulation rate but also have to put it into a connected scheme? Well that leads us to IoT. The Internet of Things.

The IoT collects data from **sensors** and **devices** and connects it with a specific **network**. That can be smart home devices like Alexa or

automated heating systems as well as any other automated system within factories, cities and other places. Of course, to make sense of all the collected data and to create a usefull reaction within the network there need to be rules like ACID, a scheme and connections within the data.

So now you can imagine how challenging IoT can be for a database.

And if you are still asking what all this has to do with Informix:

The IoT is one of the main fields where Informix is used nowadays. As a hybrid RDBMS with high funcionality, minimalistic administration requirements, a small footprint, timeseries support and the ability to deeply embed in gateways and routers.

INFORMIX can be used on the **edge** (directly within the sensor or device), on the **cloud** (public, private or hybrid) as on **premises** (e.g. on a server). It is **embeddable** what means it can be combined with already existing databases and/or applications. It doesn't need a lot of space (**low-footprint**) and is designed as a **self-management** db so there is no or very low administration needed.

ORIGIN STORY: INFORMIX

As we already mentioned, Informix is a RDBMS based system. At it's first release Informix still used the company's own informal language. But since the final release it has **ISQL** and **I4GL** included, so it is useable as for clients as for developers. We will come to that later.

Walmart is one of the biggest customers using Informix and feared about their investment in 2001 because the Informix corp. went through some major changes. It is persumed that actually Walmart talked IBM into buying the software. IBM bought the whole company too in 2005.

2017 IBM agreed to a long-term partnership of 15 years with HCL Technologies to co-develop, support and market Informix.

A little bit more about the technology:

Informix uses **native encryption**, what means it encrypts the data itself before calling the underlying file system to write the data to disk.

Thanks to the native processing of JSON, time-series, spatial (geological db using raster/vector) and relational data Informix offers a real **fast performance**.

Infomix supports **multiple API's** (application programming interfaces) and **flexible schema**.

Currently there are about **241 products** you can buy regarding to Informix, later we will get to new just a few of them.

As we said, Informix is used for IoT as for a lot of **high transaction rate OLTP** (online-transaction-processing). You could say Informix is really good at almost-real-time-transactions.

Last but not least Informix supports **heterogeneous clusters**, what means it can handle multiple embedded data bases with different architectures.

TOOLS & FEATURES

Let's see just a few tools Informix offers.

At first there is the newly baked **Informix HQ**, an administration and monitoring tool based on Java using Jetty. The Informix db itself doesn't need a lot of administration. The HQ is kind of a **dashboard** to get the data more user friendly, we will see a picture of it on the next page.

Next here is the **Informix SQL** and **4GL** we mentioned before.

ISQL is nothing more than the Infomix' **dialect of SQL**. As you can see it is very similar to the demands we all used the last couple of weeks.

I4GL is the included **development and production enviroment** for developers to manipulate the database directly.

Now you see a couple of pictures. Left above you see Informix HQ, below you see some examples of databases without using IHQ. Some of you may notice that some furniture stores use something similar. On the right side you see some code examples just to make sure everything you learn these days is really practiced out there 😉

Option oncheck -w [#sec]

Within the last update of Informix there was added the function of how many seconds the oncheck-command should wait when comming along another lock.

The oncheck-command is used to check the data and index for consistency and correctness. Found errors get repaired if possible.

You see two code examples. The first example will wait 10 seconds before timing out the other example will wait as long as technically possible.

Datatype SERIAL(n) / SERIAL8(n)

This datatype basically works like the SQL function ‚sequence' using INT or BIGINT.

Again I prepared some code examples for you. Above the datatype SERIAL is added as the primary key attribute to the table ‚name'. As there is no specific number defined, SERIAL will start with 1.

Below you can see as there are added two columns using SERIAL and SERIAL8 to the table ‚child3_tab', already defining the start number with 100 and 200.

As long as someone adds new records to that table using ‚0' as record number, SERIAL replaces ‚0' with the next available number. If somenone would like to define the number himself: no problem as long as the number is free. But be aware that if the new number is the highest within the table, SERIAL will continue counting from that new number.

The basic version of Informix is called the Developer Edition which can be installed as a test version for free after you registrated yourself. Before every installation you will have to define your role within the database.

Further there are three additional editions I want to introduce you to.

The Informix Warehouse Accelerator coffers extreme high performance on business intelligence and data warehouse style queries. It is using **in-memory**, what means instead of disk storage it uses the main memory to be faster. Also it replaces sensible data with **tokens** to protect them. **Deep compression** reduces the file size and it is a **columnar database**, so it stores data in columns instead of rows to speed up the queries.

The Informix Flexible Grid has the ability to automatically create db objects (tables, indexes, stored procedures) on all nods as a single operation. That allows a very high level of data redundancy and fault tolerance but is practical for reliable and quick dissemination of data across a global organization. It allows CDR (call detail record, e.g. data from phone calls) without primary keys as much as DDL and DML on all connected servers.

The Informix TimeSeries allows efficient and fast manipulation of time series data, such as that generated by devices such as smart electric meters, or as found in financial trading systems with time stamped stock 'ticks'. This type of data is not well suited to storage or use in the normal SQL supported style of data organization.

INFORMIX vs. ORACLE

The Informix corp. played a big part in making Unix-based RDBMS so popular and practical. 1996 they had the best system of all what put them on the first place of the „big three" database companies, next to Oracle and Sybase.

Of course they couldn't help but tease their main opponent a little bit using a billboard on the highway 101 facing Oracle. Oracle replied the same way.

Luckily someone of IBM, who also already worked at the former Informix corp., twittered pictures of those billboards for us.

WHATEVER HAPPENED TO INFORMIX

Today Informix is mainly used for databases without big administration and of course, for IoT-Solutions.

Informix still gets developed along IBMs other System called DB2. For some time people assumed DB2 and Informix would get merged, but for now that is not going to happen as they are targeted on different solutions.

Informix still has Users Groups around the globe, there also exists the IIUG (International Informix Users Group) which serves like a federation of all that users groups, offering support for Informix and organizing virtual conferences.

INSTALLATION

The installation is pretty simple. Of course you will have to check some things first. Like already said you need to register and to define yourself as the installation owner.

As far as you install Informix for a company you will have to create a own admin group and user for Informix with a secure password.

If necessary install or update JRE (Java Runtime Environment) and the JDBC Driver. You can download all this together with your Informix edition on the IBM Download page.

If wanted prepare a secure directory otherwise use the default one.

During installation there are just a couple of things to confirm and two main questions to answer:

- Do you wish a typical or custom installation?
- Should the installer automatically create a database server instance?

If necessary you can install the CSDK (Client Software Development Kit) afterwards. You can download it from the IBM Download page.

You can easily follow the installation process with the following screenshots.