The History of Oracle

From Inception to v3

Scott Hollows
Senior Principal Consultant
OnCall DBA

• 18 years experience since Oracle 6
• Former Senior Principal
  Oracle USA, World Corporate Headquarters
• Oracle USA New Instructor of the Year
• ODTUG Best Presenter

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Content

• History of Oracle
• Inception to v3
• People
• Technology
• Context

• Special Thanks
  • Bruce Scott - Interview with author 2009
  • Rich Niemic, TUSC – history presentation 2008
The problem with history

- Memories get polluted by time, false memories, egos
- Quoted out of context
- Incomplete quotes
- Confusion grows as tales pass into folklore

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When
Back To the Future

• 1979 – 1983

• between this … and this …

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Back To the Future

- 1979 – 1983
- between this … and this …

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Moores Law in Reverse

Cost of Calculations per Second per $1000

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Where

Scott Hollows
San Francisco Bay Area

San Francisco

Silicon Valley

Oakland

San Jose
Who

Scott Hollows
3 Founders + 1

Ed Oates
Founder

Bruce Scott
Employee 4

Bob Miner
Founder

Larry Ellison
Founder
<table>
<thead>
<tr>
<th>Name</th>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>Larry Ellison</td>
<td>Visionary, Motivation, Sales, Management, Installs, Customer Training</td>
</tr>
<tr>
<td>Ed Oates</td>
<td>Consultant.</td>
</tr>
<tr>
<td></td>
<td>Finishes customer project</td>
</tr>
<tr>
<td>Bob Miner</td>
<td>Lead developer. Assembler</td>
</tr>
<tr>
<td></td>
<td>Database engine</td>
</tr>
<tr>
<td>Bruce Scott</td>
<td>SQL, Views, View Flattening</td>
</tr>
<tr>
<td>Stuart Fagin</td>
<td>Mainframe Port</td>
</tr>
<tr>
<td>Bill Friend</td>
<td>Forms (IAF), RPT</td>
</tr>
<tr>
<td>Bob Preger</td>
<td>Developer</td>
</tr>
<tr>
<td>Kirk Bradley</td>
<td>Developer</td>
</tr>
<tr>
<td>Gary Kennedy</td>
<td>Sales</td>
</tr>
<tr>
<td>Others</td>
<td></td>
</tr>
</tbody>
</table>

Scott Hollows
3 Founders + 1

- Ed Oates: Founder
- Bruce Scott: Employee 4
- Bob Miner: Founder
- Larry Ellison: Founder
Lawrence “Larry” Ellison

- Oracle CEO
- One time richest man in the world #4 Nov-2009
- Visionary
- Charismatic
- Ultra Competitive
- Sports
  - Yachts Racing
  - Pilot – Fighter Jets

- “It’s all about Larry. This was Larry’s company”
  Bruce Scott on the early days of Oracle - Author Interview
Ed Oates
3 Founders + 1

Ed Oates  Founder
Bruce Scott  Employee 4
Bob Miner  Founder
Larry Ellison  Founder
Edward “Ed” Oates

• Founder

• Consultant on PI project

• Remained at PI to complete project
  • Helped fund development
  • Allowed Bob, Bruce to focus on Oracle database development

• *Ed did not write any Oracle code*”
  – Bruce Scott Author Interview
Edward “Ed” Oates

- Ed owned 20%
- Sold back to Oracle to fund divorce settlement
- $20k (10k cash, 10k promisory note)

- Later returns as an advisor

- Bob shares increased by 10% around this time
Bob Miner
3 Founders + 1

Ed Oates  Founder
Bruce Scott  Employee 4
Bob Miner  Founder
Larry Ellison  Founder
Robert “Bob” Miner

- Author & Architect of Oracle up to v3
- Database Architect
- The Database Engine Guy
  - Disk IO, Storage, Btree indexes
- Seasoned Programmer
- Assembler
- Original SDR President

- The heart of Oracle
- Died 1994 age 52
Bruce Scott
3 Founders + 1

Ed Oates  Founder
Bruce Scott  Employee 4
Bob Miner  Founder
Larry Ellison  Founder
Bruce Scott

- Employee #4
  #1 after the 3 founders

- Co-Author and Co-Architect of Oracle v1-3

- First line of code for Oracle

- Rewrite v3 in C

- Bruce is The SQL Guy

- Left before v3 shipped
Scott / Tiger

• Tiger was daughter Margaret’s cat

• Gray bitsa

• Tables were based on demo data in IBM SQL Publication
Bruce Leaves

• Leaves before v3 ships

• Sells back all 5% for $400 k ($1.2 – 1.5 m today)

• Later co-founds Gupta

• Today VP of Engineering
Names

Scott Hollows
• 1977 Jun  Software Development Laboratories (SDL)

• 1979 Jun  Relational Software Inc (RSI)

• 1982  Oracle Systems Corporation
        Oracle Corporation
        Oracle

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Oracle Product Name

1. ORACLE Oak Ridge National Laboratory

2. CIA Project ORACL ← no “E”
   - “Probably a code name, definitely no E”
     - Bruce Scott Author Interview
   - Large storage
   - Tape wrapped around a drum

3. SDR
   - Larry uses product name from the CIA Project
   - “You got a lot of nerve”
     - Dave Roberts, CIA
Timeline
1977 Ampex

- Bob, Larry and Ed work at Ampex
- Larry reports to Bob Miner
- Larry meets Ed Oates
- Work on CIA project
  - Code name “ORACL”
  - The answer to everything
- PDP-11
  - “basically a CODASYL rip off” - Larry
  - “… more like “based on” ”
    - Bruce Scott Author Interview

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Precision Instruments

• Larry moves to Precision Instruments
• Larry Meets Bruce Scott at PI
SDR Forms … first project

- Discovers need for $400k consulting project
  - Estimate - 3 people, 2 years
- 3 founders forms SDL (Larry, Bob, Ed)
  - Software Development Labs
  - Bob is president as Larry still works for PI
- No office, work at PI client site
- 90% completed by end of 1st year

Scott Hollows
AmPex Precision Instruments

CIA Project
Codename
ORAÇL

Hi Bruce

2 years
3 people

Hi Larry

SDR

President

Founder

Founder

Founder

Employee 4

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Larrys wants SDR to be a software company

- Difficult to scale consulting
- Software profit margins are high
- Cullinet was Larry’s role model for Oracle
  - $100 million annual sales
- Larry reads Codd’s paper
Databases of the Day

- Flat
- Hierarchical
- Network

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Dr Edgar Codd’s Papers (IBM)

- Paper #1 - 1968
  - Dr Edgar Codd (IBM Research Laboratory, San Jose) publishes internal IBM paper on relational database theory

- Paper #2 - 1970
  - Codd publishes public paper
  - Theoretical
  - Mathematical based
  - Predicate calculus

\[
\begin{align*}
\pi_2(T) &= \pi_1(R), \\
T(j, s) &\rightarrow \exists p \left( R(S, p) \land S(p, j) \right), \\
R(s, p) &\rightarrow \exists j \left( S(p, j) \land T(j, s) \right),
\end{align*}
\]

- Sparks research projects

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Larry finds IBM Sequel paper

- Larry learns about IBM Sequel from IBM conference proceedings (he bought the papers)
- $200k in the bank
- Larry asks Bob and Bruce if they can develop it
  - “Can you do this?”
  - “We thought it would be easy enough to do, so we started it”
    - Bruce Scott
- Bob and Bruce start development of Oracle database
- Ed finished the remaining 10% of the PI contract

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IBM SQL Papers

- Until 1979 System R was publishing everything
- Why did IBM publish the SQL papers?
- Why did they include the syntax?

- Software not patentable
- Publishing increases IBM profile
- Low competitive risk – difficult to implement
IBM SQL

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IBM SQL / System R IBM

- System/R research group
- San Jose Research Laboratory
- Creates SEQUEL
  - Structured English Query Language
- Renamed to SQL
  - Sequel was trademark of UK based Hawker Siddeley aircraft company

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IBM Slow to Release

- Research group … not product development
- Long product life cycle plans
- Conflict with existing products
- Culture and reputation of release quality products

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Goals
Winning in an IBM dominated market

1) Lemora Strategy
   feed off IBM

2) Compatible
   Printers, Tape, Disk, Mainframes Clones

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Larry’s strategy

- IBM defines and validates the SQL market
- Ship before IBM
  - “Time To Market Is Everything” – Ellison
  - "Market share is everything. In the long run you will live or due by market share”
    - Ellison
- Shouting rights
- Nothing to risk anyway

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Prioritized Goals

1) Time to Market !!!

2) Features - match IBM SQL
3) Performance

4) Quality
5) Competition

Bruce Scott Author Interview

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Relational Database Firsts

- First commercial, relational database (Jun 1976)
  - Honeywell MRDS / Multics Relational Data Store
- IBM
  - System/R Project
  - SEQUEL database – later SQL
  - First SQL database to begin development
  - Defined SQL language
- Oracle
  - First commercially available SQL database

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Features Match IBM

- Larry contacted System R and asked for SQL error codes
  - Rejected – IBM Confidential

- Not 100% Implemented by Oracle

```sql
SELECT DEPT FROM EMP WHERE SET (NAME, MGR) =
  { '<SMITH', 'JONES'>,
    '<JOHNSON', 'JONES'>,
    '<HUGHES', 'JONES'> }
```
Quality
Quality

- Customers wanted SQL “NOW!”
- The market did not want or need quality
- Standard practice
  - Select hardware first, then find the software
  - Heavily customize software
  - Used to hacking to get systems running
  - “Aimed at technical customers”
    Bruce Scott Author Interview
- Uses
  - Mainly for reporting & data analysis, not data entry
  - Stability not critical
  Scott Hollows
Early Customers
First Customer

• Wright Patterson Airforce Base
  CIA Advanced Technology Division

• “No idea of what they used it for”
  – Bruce Scott Author Interview

• Oracle v2
Early Customers

• Word travels fast in intelligence community
• Within 6 months sales to
  • CIA
  • Navy and Airforce Intelligence
  • NSA

“Larry Ellison got most of these intelligence sales”
  - Bruce Scott Author Interview

• Mil / Intel are not target customers.
  The sales just came in that way (referals, leads)
Early Customers

- USA Military and Intel
  - Existing Contacts
  - Cold War
  - Well funded
  - Need for data analysis
  - Large amounts of data
  - Word spreads fast in Intel community
  - Customers came looking for Oracle

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Development
Development Hardware

• Brains of a Furby or Commodore 64

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Development Hardware

- Oracle v1 – 2
- PDP 1140
- “PDP had 64k memory”
- “Oracle compiled files were 100k”
- “Used memory overlays”

- Bruce Scott Author Interview

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Development Approach

- Rough specs created by Bob
- No regression testing
- Some coding standards – one function per file

- Bob focuses on database engine
- Bruce focuses on SQL
Development Environment

• 6 days weeks
• Work at home to reduce travel time
• Dial in from home to office compute
  • V2 300 baud modem
  • V3 dedicated lines
Versions

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v1
Version 1

- Was not released commercially
- Probably released to CIA
- “The first version of the database was called Oracle version 2. I didn’t think anyone would buy version 1 of a database from five guys in California”
  
  Larry

- Developed On
  - PDP-11
  - 128 KB max memory
  - PDP Assembly language – not portable
Version 2  1981 release

- 2 years to create
- Performance
  - Early prototypes were very slow
- First commercial SQL database released
- Beats IBM to market
- Sub-queries  (Correlated Subqueries in v5)
- “was really not usable as a database”
  - Dave Roberts, CIA
- Compiled files approx 100 k

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Data Dictionary uses SQL

- “v3 definitely used SQL for data dictionary, not sure about v2” – Bruce Scott Author Interview

- Chicken before the egg
  - Bruce Scott writes bootstrap to allow create table before dictionary is available

- Bruce Scott writes dictionary cache to decrease SQL compile time

- Probably the most complex SQL app at the time

Bruce Scott Author Interview

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The market moves from PDP to VAX

• “VAX is released after v2 ships”
• “PDP market quickly moves to VAX”
• “Attempts to use Oracle in VAX PDP emulator mode fails”
• “Porting becomes a major problem”
• “Oracle get 1st VAX delivered to Northern California”
• “v2 and 3 consume VAX resources”

• Bruce Scott – Author Interview

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Rewrite in C for Portability

• Porting problems
• Goal – single code base for ports
• “No other languages considered”
• Bruce Scott Author Interview
• Bruce recommends C to Bob
  • Knows C from Uni days
  • Bruce has C experience at Ford Aerospace – early C adopter
• “Bob disagrees – he wants to stick with assembler for performance reasons”
• Bob - focuses on PDP assembler support
• Bruce - works on C rewrite
Early Interface

- C API
- UFI (later SQL*Plus)
  - UFI = User Friendly Interface
- FMT format
  - Developed by Bruce Scott
  - Creates for UFI help/doc
  - Tag based formatter language. Early HTML like.
  - UFI uses FMT to create help doc
- RPT
  - Reporting tool
  - Created by Bill Friend
  - Based on FMT
- IAF (Later Oracle Forms)
  - Developed by Bill Friend

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Quality

v3 “wasn’t very reliable … in the database world there are couple of things that you can never do… One is you can’t lose data and the other is you can’t return wrong answers”

- Larry

“In the early days we had problems losing data and returning the wrong answers”

- Larry

Ref DGOD p96

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Bruce Scott leaves

• High pressure

• Bruce quits before v3 ships

• Bob Miner was focused on PDP Assembler. Takes over Bruce’s work. Difficulties
Summary
Oracle’s Early Success

- Larry Ellison
  - The driving force behind Oracle
- Bob Miner
  - Technical genius & architect – database engine
- Bruce Scott
  - Co-Architect – the SQL guy
  - “It's all about Larry”
  - “The thing that made Oracle successful was Larry's charisma, vision and his determination to make this thing work no matter what”

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The End

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Books

My Recommendation ➔

Scott Hollows
Questions

Q & A

Scott@OnCallDBA.com.au

Scott Hollows