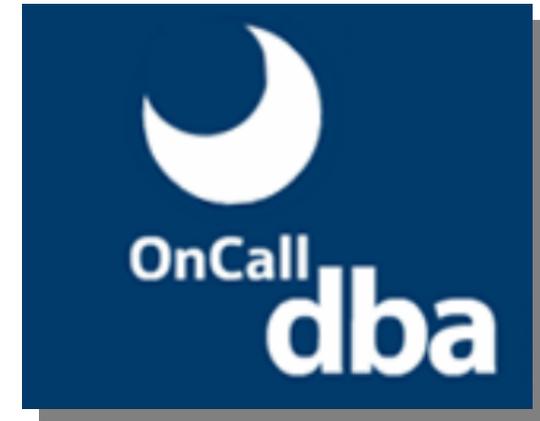# The History of Oracle
From Inception to v3

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

Email   Scott@OnCallDBA.com.au

Web   www.OnCallDBA.com.au

Content

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

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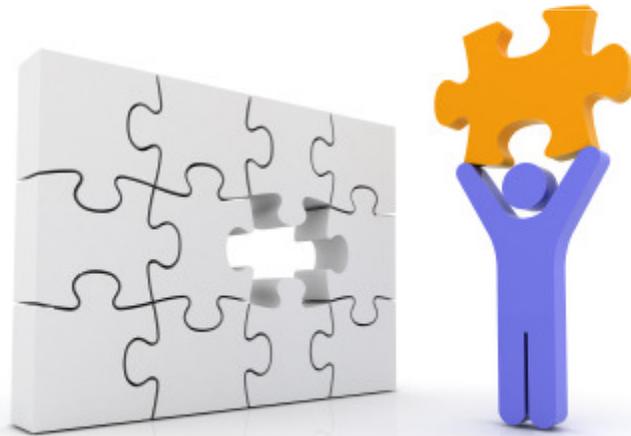 - Rich Niemic, TUSC – history presentation 2008

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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

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Back To the Future

- 1979 – 1983
- between this …   and this …

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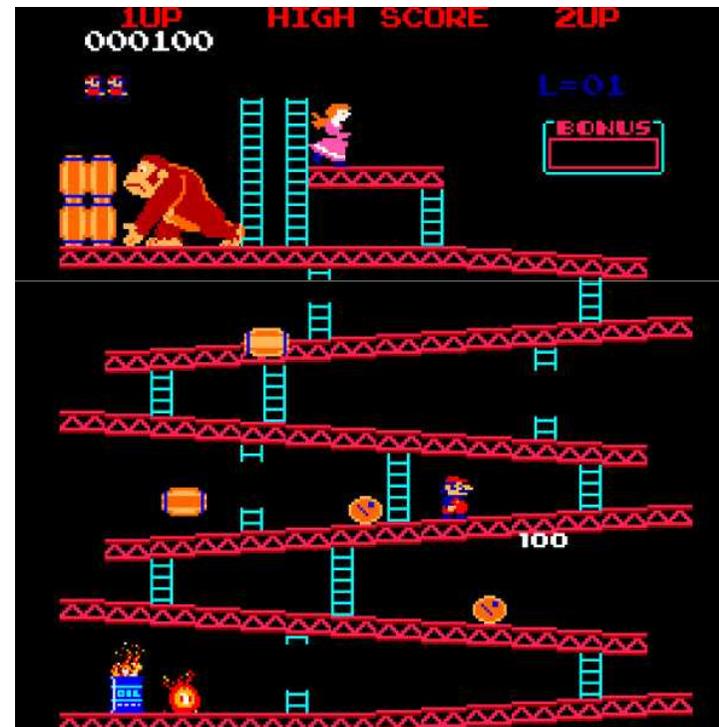
Back To the Future
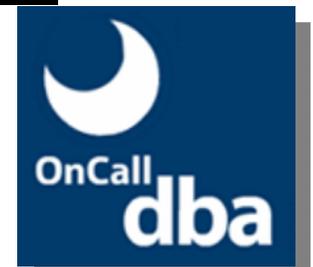
- 1979 – 1983
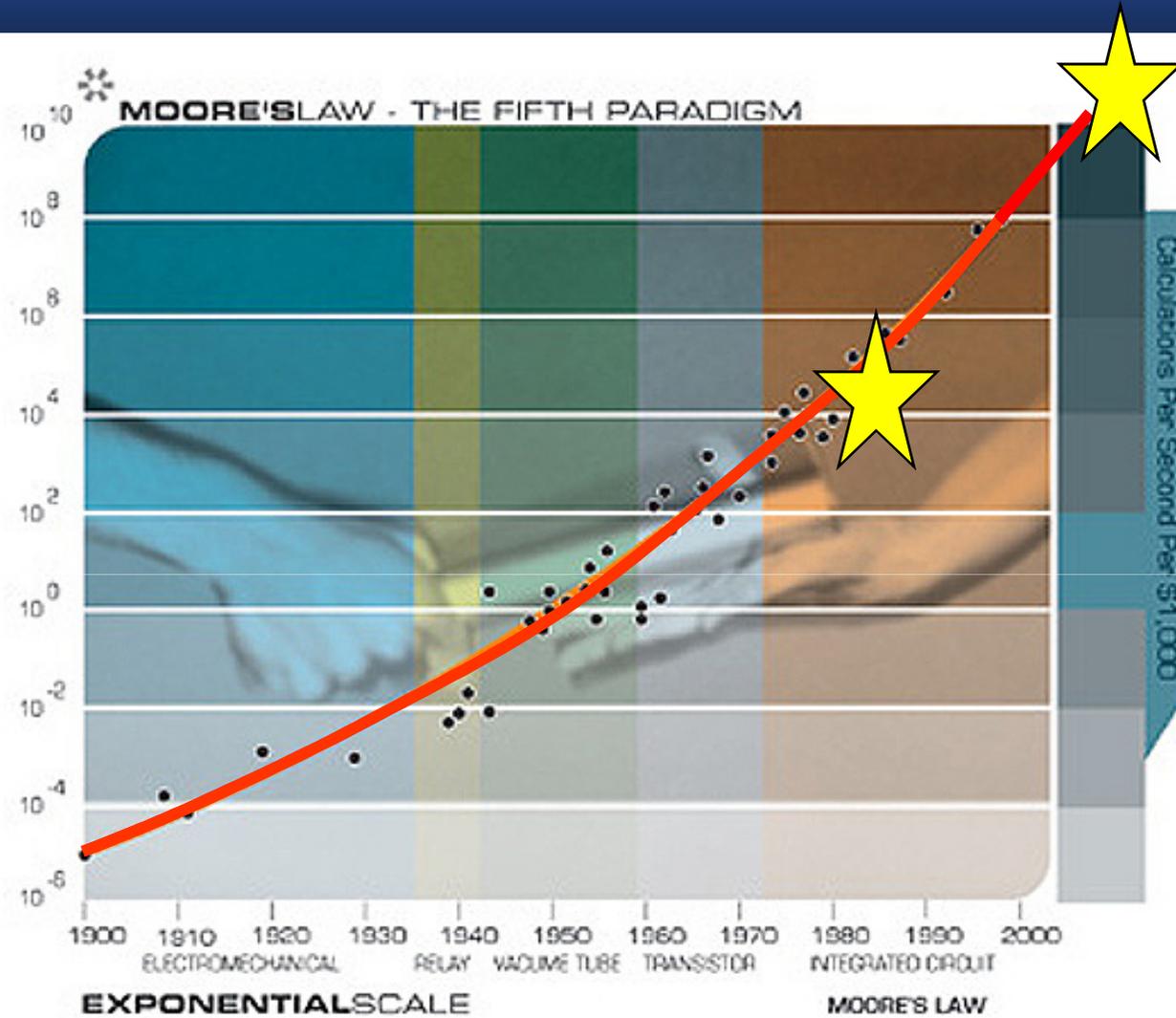- between this …   and this …

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Moores Law in Reverse

Cost of Calculations per Second per $1000

Scott Hollows

Where

Scott Hollows

Scott Hollows

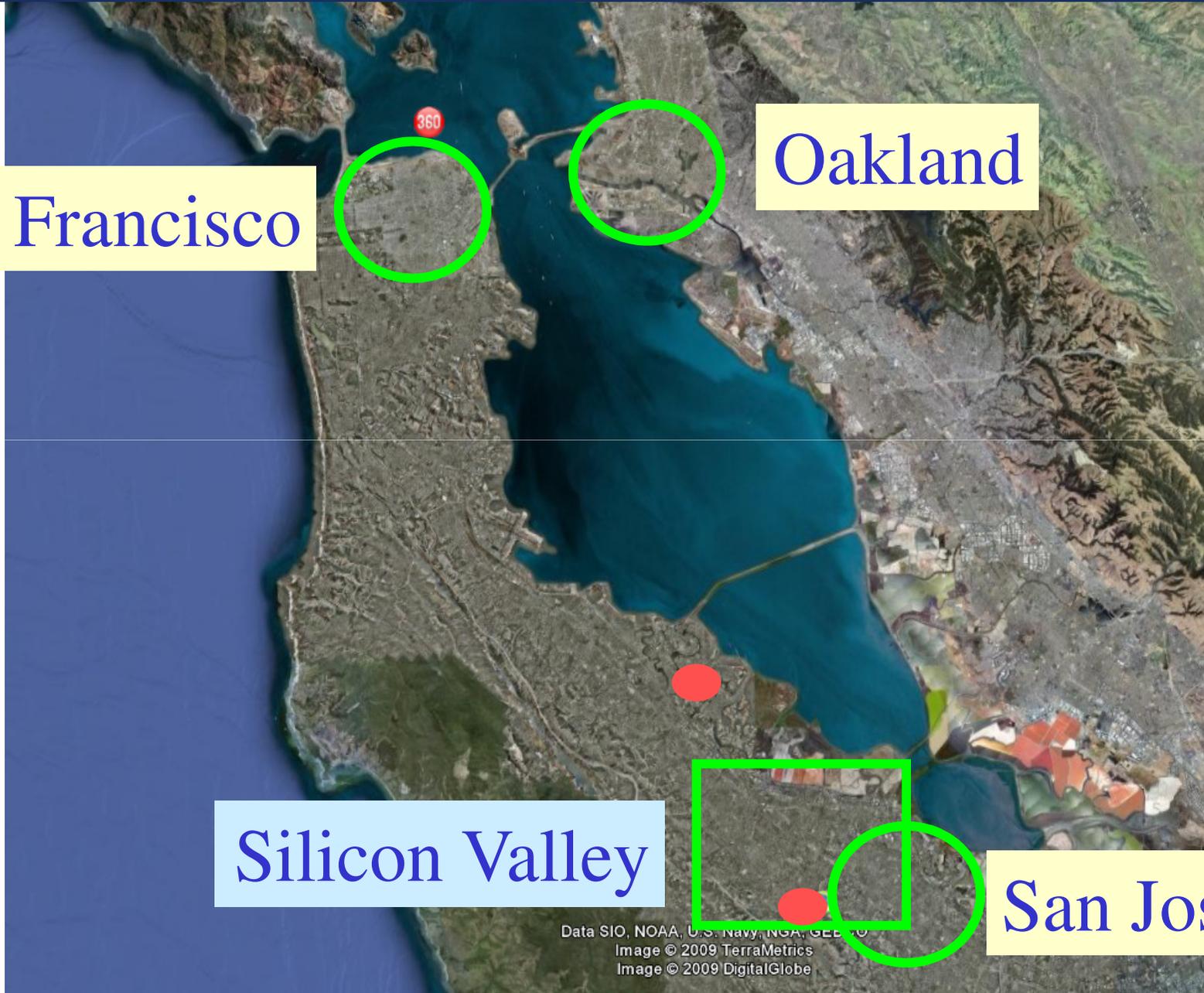# San Francisco Bay Area

Who

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3 Founders + 1

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

Whose Who in the Zoo

Larry Ellison	Visionary, Motivation, Sales, Management
	Installs, Customer Training
Ed Oates	Consultant.
	Finishes customer project
Bob Miner	Lead developer. Assembler
	Database engine
Bruce Scott	SQL, Views, View Flattening
Stuart Fagin	Mainframe Port
Bill Friend	Forms (IAF), RPT
Bob Preger	Developer
Kirk Bradley	Developer
Gary Kennedy	Sales
Others …	

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Larry Ellison

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3 Founders + 1

Ed Oates   Bruce Scott   Bob Miner   Larry Ellison
Founder   Employee 4   Founder   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"
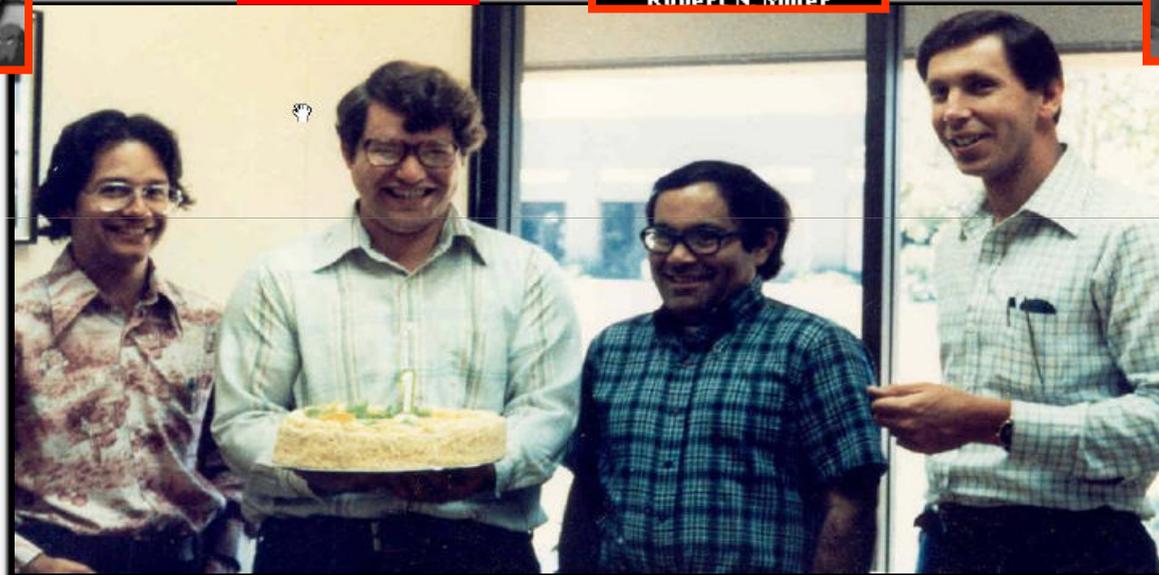
  Bruce Scott on the early days of Oracle - Author Interview

Ed Oates

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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

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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
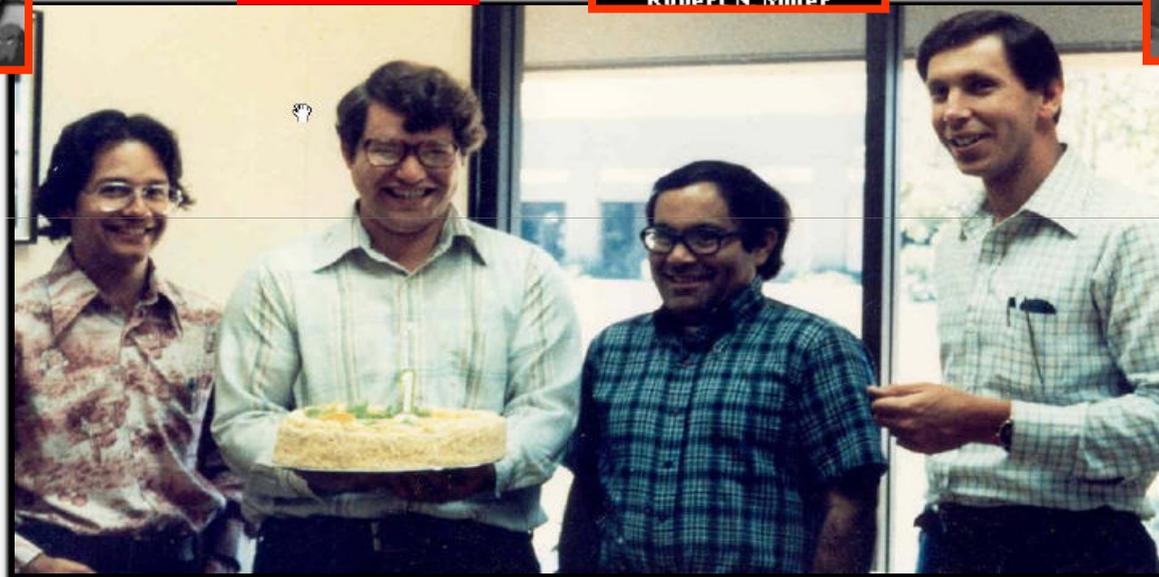
Bob Miner

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3 Founders + 1

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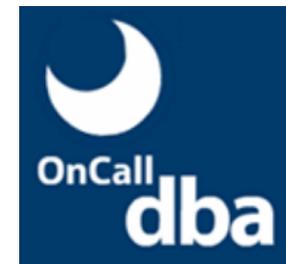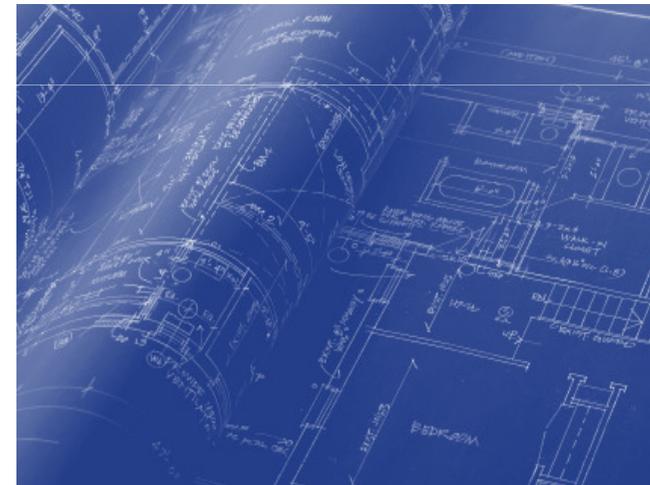
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Bruce Scott

Scott Hollows

3 Founders + 1

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

SQL

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Scott / Tiger

Not The Actual Cat →

- Tiger was daughter Margaret's cat

- Gray bitsa

- Tables were based on demo data
  in IBM SQL Publication

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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

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Company Name

- 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*

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Timeline

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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
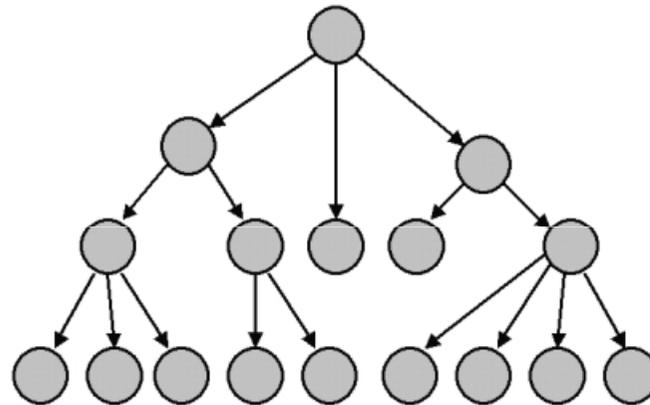
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Larrys wants SDR to be a software company

- Difficult to scale consulting

- Software profit margins are high

- Cullinet was Larry's role model for Oracle
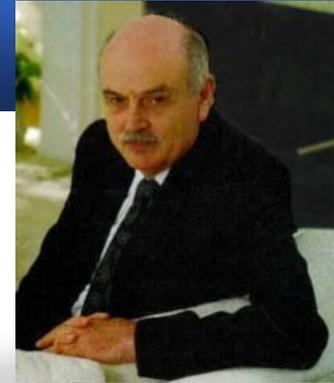
  - $100 million annual sales

- Larry reads Codd's paper

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Databases of the Day

- Flat

- Hierarchical

- Network

Dr Edgar Codd's Papers (IBM)

- Paper #1 - 1968

  - Dr Edgar Codd (IBM Research Laboratory, San Jose) publishes <u>internal</u> IBM paper on relational database theory
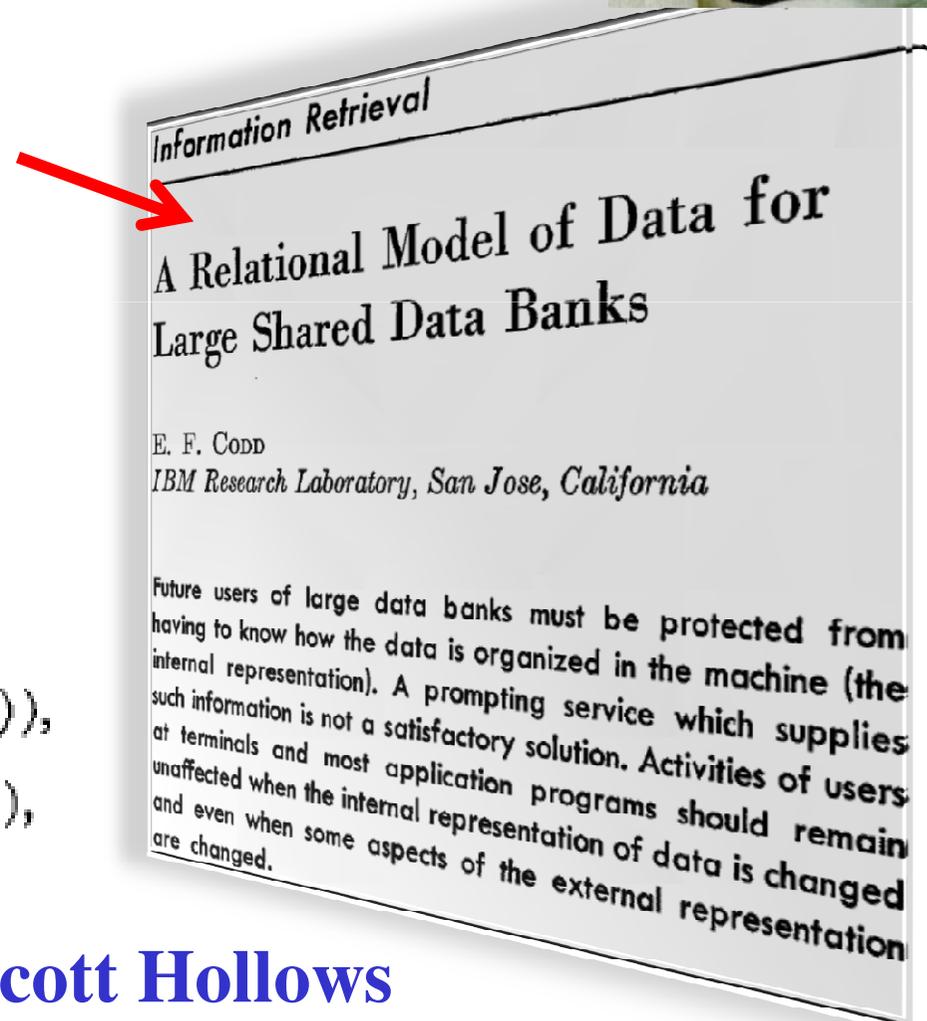
- Paper #2 - 1970

  - Codd publishes <u>public</u> paper

  - Theoretical

  - Mathematical based

  - Predicate calculus

$$\pi_2(T) = \pi_1(R),$$

$$T(j, s) \rightarrow \exists p\, (R(S, p)\, \wedge\, S(p, j)),$$

$$R(s, p) \rightarrow \exists j\, (S(p, j)\, \wedge\, T(j, s)),$$

- Sparks research projects

Information Retrieval

A Relational Model of Data for Large Shared Data Banks

E. F. Codd
IBM Research Laboratory, San Jose, California

Future users of large data banks must be protected from having to know how the data is organized in the machine (the internal representation). A prompting service which supplies such information is not a satisfactory solution. Activities of users at terminals and most application programs should remain unaffected when the internal representation of data is changed and even when some aspects of the external representation are changed.

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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

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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 <u>SQL</u>
  - 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
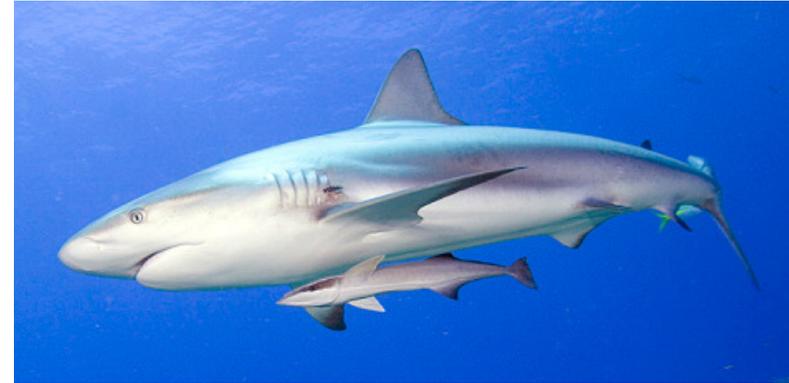- Culture and reputation of release quality products

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Goals

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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

```
SELECT      DEPT
FROM        EMP
WHERE       SET (NAME, MGR) ⊇

            { < 'SMITH', 'JONES' >,
              < 'JOHNSON', 'JONES' >,
              < 'HUGHES', 'JONES' >}'
```

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Quality

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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

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First Customer

- Wright Patterson Airforce Base
  CIA Advanced Technology Division

- "No idea of what they used it for"
  – Bruce Scott Author Interview

- Oracle v2

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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)

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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

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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

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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

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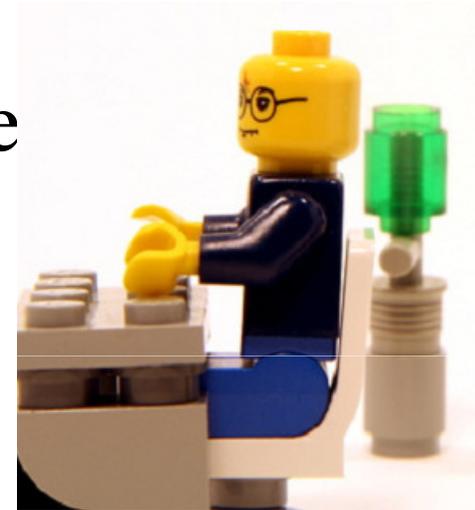
Versions

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v1

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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

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v2

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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
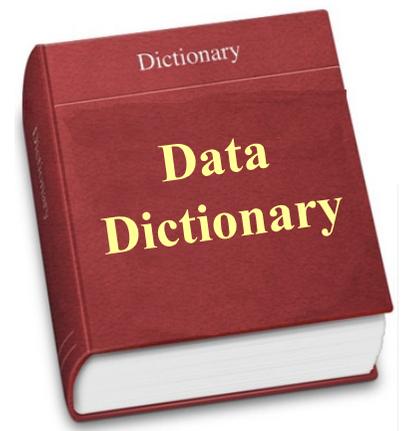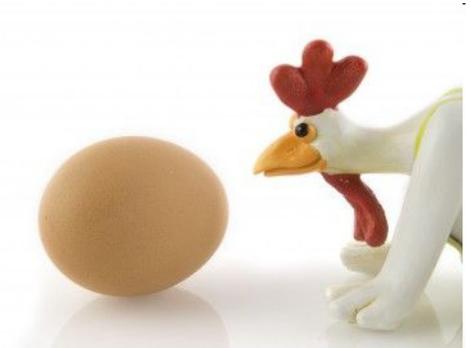
Bruce Scott Author Interview

Scott Hollows

v3

Scott Hollows

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
  Scott Hollows

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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

Bruce Scott Author Interview

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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 "<u>*wasn't very reliable*</u>* ... in the database world there are couple of things that you can never do... One is you cant lose data and the other is you cant return wrong answers"*

- Larry

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

- Larry

▶| Ref DGOD p96   **Scott Hollows**

Bruce Scott leaves

- High pressure
- Bruce quits before v3 ships

- Bob Miner was focused on PDP Assembler.
  Takes over Bruce's work.
  Difficulties

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Summary

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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
  - "Its 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"
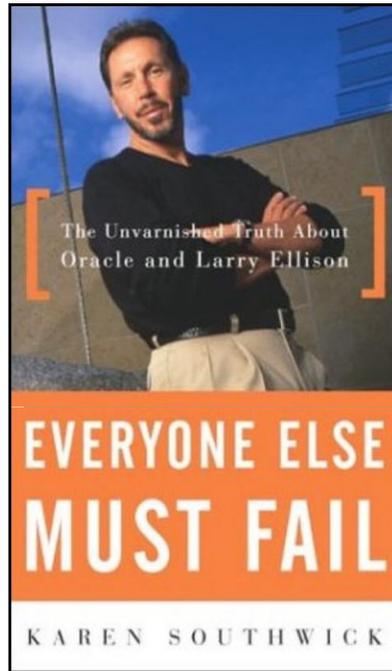
Scott Hollows
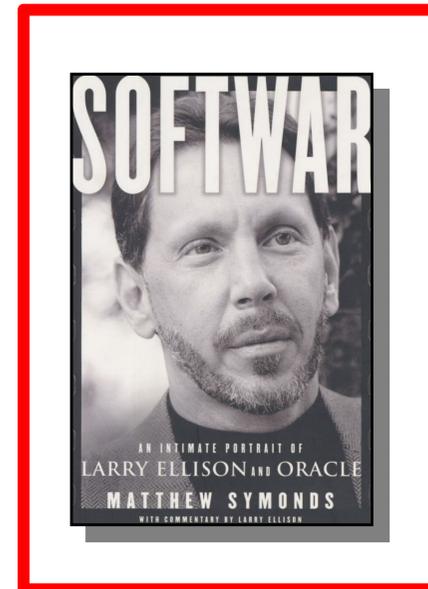
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The End

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Books
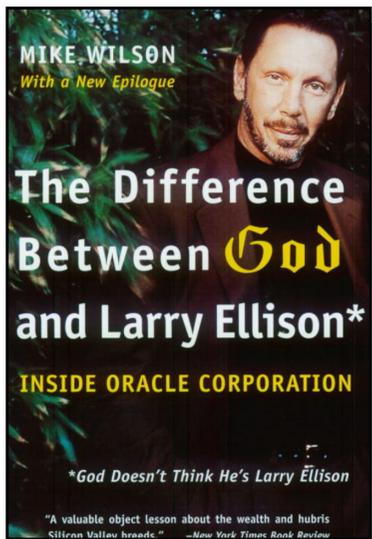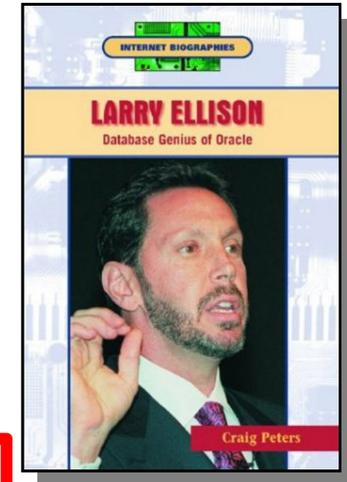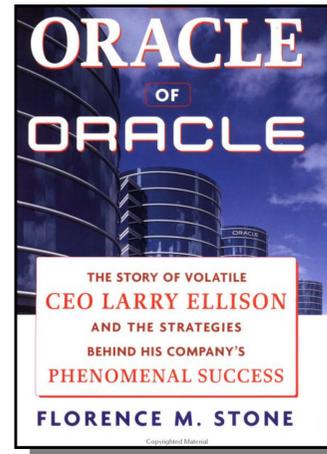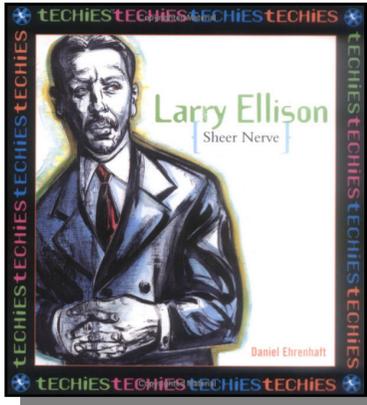
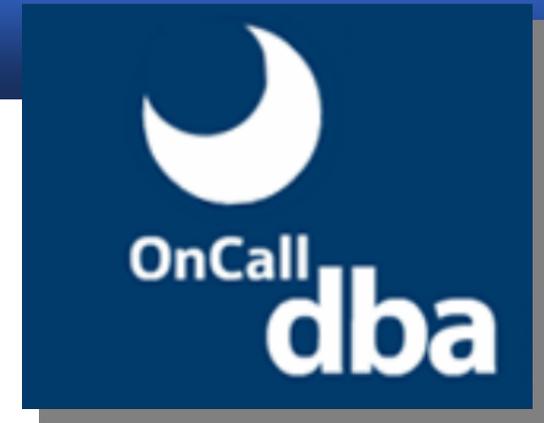My Recommendation →

Scott Hollows

Questions

Q&A

Scott@OnCallDBA.com.au

Scott Hollows