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Evolution of a Data Quality Strategy

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Executive Summary/Abstract: This presentation is a review of the role of data quality at ON Semiconductor Inc., through the eyes of three IT professionals. The authors provide insight into the evolution of IT data quality efforts, over a tumultuous two year period that included a corporate buyout, an IPO, and a significant corporate acquisition, all followed by the most severe recession in the history of the semiconductor industry.

The authors provide details on the struggle to implement data quality concepts and provide insight into how the economic and industry downturn is leading to a renewed focus on Information Quality at ON Semi.

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About ON Semiconductor

- ON Semiconductor (Nasdaq: ONNN) offers an extensive portfolio of power- and data-management semiconductors that address the design needs of today's sophisticated electronic products, appliances and automobiles
- Leader in Micro Packages and strong presence in the industry with three main product lines (power management & standard ICs, high-performance logic, and standard semiconductors)
- Principle Markets
  - ◆ Computing and Networking
  - ◆ Wireless and Portable
  - ◆ Automotive
  - ◆ Multi-Market
- Approximately 8000 employees worldwide
- 9 Manufacturing Locations
- Headquarters in Phoenix, AZ

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Agenda

- 2000 - ON's Data Quality (DQ) Challenges
- 2001 – A Change in Direction
- 2002 - Application and Data Architecture
- Lessons Learned

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2000 - ON's Data Quality Challenges

- ON Semiconductor, spun off from Motorola, Inc. in 1999
- Rapid "separation" called for a "clone-and-go" of IT Systems and Data
- In 2000, IT was faced with discrepancies and inconsistencies in data, best exemplified by corrupt and unusable data in our Directory Services Application
  - ◆ Invalid locations
  - ◆ Invalid department numbers
  - ◆ Incorrect employee information, etc.
- High potential for numerous occurrences of data corruption across the enterprise

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2000 - IT's Response to Data Quality Problems

- Began searching for proven methods of improving data quality
- Identified thought leaders in the Data Quality space:
  - ◆ Dr. Richard Wang, Co-Director for MIT's TDQM Program
  - ◆ Larry P. English, author of Improving Data Warehouse and Business Information Quality
- Consulted directly with Prof. Wang on data quality strategies and methods
- Researched tools and methodologies for introducing data quality concepts
- Began to look for ON-Semi candidate systems for implementation of measurable data quality improvement efforts
- Launched initiative to address issues stemming from DQ problems

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2000 - Key Elements of the IT Data Quality Initiative

- Implemented an IT Data Quality Assessment with IT development teams
- Identified potential IT data quality metrics
- Developed "draft" data administration standards
- Recommended potential data cleansing efforts
- Proposed data quality architecture
- Developed a strategic plan for data quality in IT

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2000 - DQ Initiative: Developing a Strategic Plan

- Presented industry research and findings to directors in the IT and quality departments as part of an "introduction to data quality" concepts
- Held regularly scheduled work sessions with IT and quality directors to identify and address data quality issues
- Data quality process improvements were added to the official IT LRP (long range plan)
- A "high profile" pilot was identified for a data quality assessment : The directory services application

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2000 - Data Quality Pilot

- The pilot effort focused on a single data element, and traced it's impact throughout our systems
- Interviews were held with the application team, system users, information providers, etc.
- System documentation and interfaces were reviewed
- Error log files, error reports, and data files were analyzed as outputs
- Data architecture was reviewed, including system of record identification and data schemas

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2000 - Data Quality Pilot Results

- Poor data architecture - inconsistent data definitions
- Poor IT/Business Processes - improper use of the system by users and poor training provided by IT
- Corrupt, redundant, and incorrect data in the system (from externally interfaced systems and conversion sources)
- Inconsistency of data due to poor integration, synchronization, and maintenance
- Poor "data ownership and stewardship" practices for business subject areas

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2000 - Data Quality Pilot Outcomes

- The pilot was successful and well received
- The pilot reinforced our Data Quality strategy
  - A targeted and well scoped data cleansing effort is necessary
  - Come up with proper and complete data definitions
  - Establish a process to facilitate system of record identification
  - Approach DQ efforts as projects separate from IT program
  - Act upon findings from data quality assessment and commence activities in Q1 of 2001 as a data quality project

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2001 – Industry collapse becomes catalyst

- Entire semiconductor industry experiences worst business year in its history
- ON Semiconductor implements numerous cost saving measures – including workforce reductions
- Top IT leadership changes at ON Semiconductor
- The IT budget is cut and the staff reduced
- Company's investment on "formal" Data Quality efforts are minimized
- Efforts directed at broad IT processes diminish and application portfolio is pruned
- Overall strategy was the same but tactics had to adapt so Data Quality efforts continue in a more isolated and granular way. *For example…*

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2001 - Data Quality Efforts: Data Cleansing

- While systematic & organization wide DQ efforts stalled, data cleansing efforts continued:
  - The conversion of the HR system from a legacy environment to the Oracle 11i HR application provided the opportunity for the cleansing of legacy HR data
    - *Developed PL/SQL and SQR utilities to transform the legacy data*
    - *Used Oracle's packaged address validation tool*
    - *Used USPS web site to help solve zip code issues*
  - The recommended cleansing of customer and location information from the 2000 Data Quality Assessment was executed in 2001

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2001 - Data Quality Efforts: Data Administration

- *Tools*: Data Administration tools that were seen as a "means to an end" are now being viewed as strategic tools that can be used to "enforce" data standards, integrity, and quality
  - ◆ CA's COOL:G**EN** – Fully integrated application deployment and modeling tool
  - ◆ Taviz – ETL based data cleansing
  - ◆ EDA Website and Oracle Designer Repository - Impact analysis, modeling, data standards, system of record, and system documentation
- *Processes*: In response to cost-motivated outsourcing efforts, data administration standards and processes have been implemented to ensure data quality for ON Semi and SLA compliance for our outsourcing agency

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2001 – Transition to Value Based IT

- Minimal IT resources (less people, smaller budget)
- IT organizations must prove their value by doing more with less
- Corporate leadership expects higher quality systems developed at lower cost
- Can not afford to implement separate data quality projects
- Must integrate data quality with overall IT program management efforts to maintain the integrity of corporate data
- A vehicle was needed to integrate data quality into IT program management

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2002 – Governance and Application Architecture

- The IT Governance Process is a defined method of program selection that ensures that only programs that best enable company objectives and provide a competitive return on investment are pursued.
- A key element of the governance process is the IT Architecture Self-Assessment
- This is a tool for aligning program selection and system implementations with corporate directives
- The Architecture Self-Assessment is a deliverable of ON Semi's software development process. This process encompasses phase deliverables and milestones for application & software development.

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2002 - The IT Architecture Self-Assessment

- Overall goal is to have key questions answered to help gain a general understanding of the project while ensuring that project is satisfying the requirement(s) of core, strategic business processes.
- Assesses data quality by validating project design:
  1. Have system of record and data ownership been considered?
  2. Have data administration standards been reviewed?
  3. Has the project's ERD been reviewed?
  4. Have data integration issues been identified?

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2002 – Application and Data Architecture Alignment

- Corporate Data Model is being incrementally enhanced to document and reflect implementations of data and strategic business processes
- Enable data integration
- Provide user friendly view of data and metadata to facilitate the use of data strategically throughout the corporation
- Governance for implementing data requirements
- "Drive incremental and demonstrable improvements in the visibility, usability, and quality of Data at ON"

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2002 – Aligning Data Quality with Business Processes

- Identify the strategic business processes
- Determine the data requirements and inter-dependencies between strategic processes, entity/data elements, and KPIs
- Use Architecture Self-Assessment as a vehicle within the software development process to ensure that data requirements map to a strategic business process

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Lessons Learned

- Data Quality is tangible and measurable
- Data Quality efforts are NOT the "first to go" when the business takes a turn for the worse
- Data Quality is NOT too big an undertaking to address with tactical efforts
- Data Quality improvement is essential and compulsory for improving the bottom line
- You must have Governance
  - Align w/key business processes and strategies
- You can't create IT Value without improving Data Quality

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