



The World Leader in High Performance Signal Processing Solutions



# Innovating Across Every Dimension

- ◆ Technology
- ◆ Systems Expertise
- ◆ Supply Chain

**ASUG New England**

June 2012





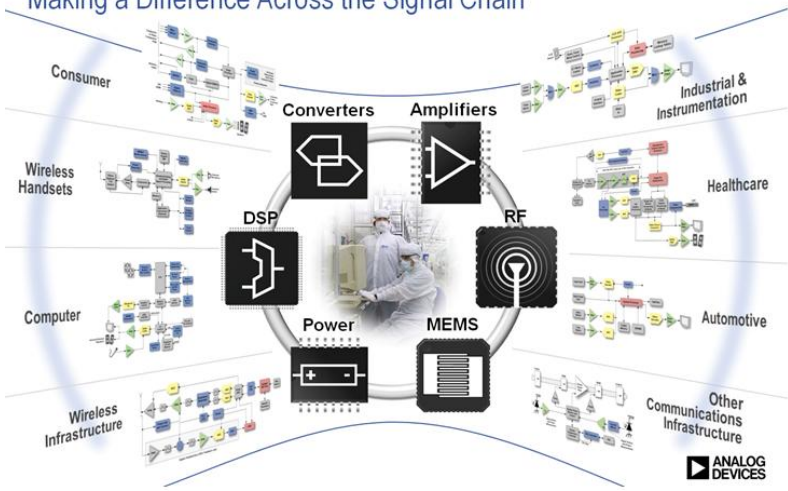
# Company Profile

- Semiconductor company specializing in signal processing technology that translates what we see, hear, and feel into the digital world...and back
- Breadth of > 10,000 products serving more than 60,000 customers in all electronics market segments
- Founded 1965
- FY2011 Revenues of \$3.0B -- Invest 17% in R&D –



## Innovation in World-class Technologies

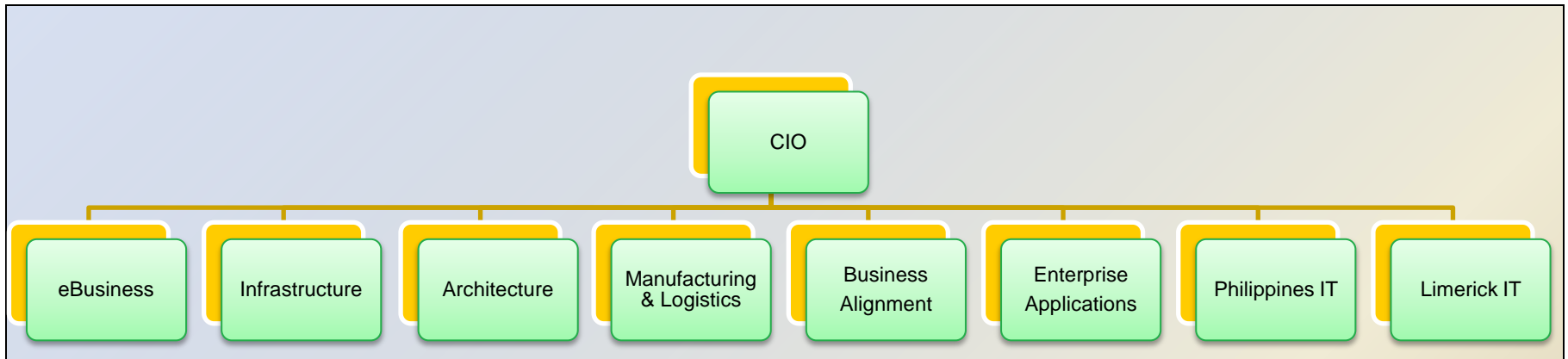
Making a Difference Across the Signal Chain



- Traded on the NASDAQ Global Select Market – Part of the S&P 500
- Headquartered in Norwood, MA, with a global presence
- 9300 employees across 26 countries  
*3 largest: US, Philippines, Ireland*



# Analog IT Profile



- ◆ **ADI Corp/Regional IT comprised of ~250 Employees and Contractors**
- ◆ **Primarily centralized with distributed teams supporting major manufacturing locations**
- ◆ **Primary Mission is to increase the business value of IT**
- ◆ **Analog invests approximately 2% of Revenue in IT**
- ◆ **Heavily focused on supporting engineering innovation**



# ADI Core Application Technology Platforms

 <ul style="list-style-type: none"> <li>- Core ERP</li> <li>- Back Office</li> <li>- Mfg. Planning?</li> </ul>	 <ul style="list-style-type: none"> <li>- Internal Collaboration</li> <li>- Application Building (Front end for HR Self Service, GTC..)</li> </ul>	 <ul style="list-style-type: none"> <li>- Executive Dashboards</li> <li>- Standard and Adhoc Reporting</li> </ul>	 <ul style="list-style-type: none"> <li>- SFA</li> <li>- Tech Support</li> <li>- Channel Partner</li> <li>- Marketing Process</li> <li>- Sales Content</li> <li>- Customer Support?</li> </ul>	 <ul style="list-style-type: none"> <li>- Custom Apps</li> </ul> <p>Analog.com PLE</p> <hr/> <p>eReq T &amp; E</p>	 <p><b>Best in Class/ Industry Specific</b></p> <ul style="list-style-type: none"> <li>- Harte Hanks</li> <li>- Promis</li> <li>- Adexa</li> <li>- Jive</li> <li>- Savvion</li> </ul>
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Security/Data Integrations



# SAP Transformation Background

- ◆ **Went Live with SAP in 1995 – Version 2.1D**
  - **Modules Supporting Financials, Sales and Distribution, Logistics, Purchasing, Planning**
  - **Customizations Due to Lack of Functionality**
  - **All Upgrades Have Been Primarily Technical**
- ◆ **Implemented CRM in 2001 for eCommerce**
  - **Ordering and Samples**
  - **Customer Portal**
  - **Online Quoting System for our Distributors**
- ◆ **Implemented DRM (Channel Mgt) in 2002 as Part of DIMP Add-on**
- ◆ **Implemented HCM on a Separate Platform in 2007 (ECC6)**
- ◆ **R/3 Upgrade to Release 4.7 in 2006; no Support Packs Applied Since**
- ◆ **Two hardware Instances Supporting R/3 and ECC**
- ◆ **~ 10,000 ADI Developed Objects**
  - **204 Modification (73 active)**
  - **25 clones**
- ◆ **CRM and DRM modules at “End of Life”;**
- ◆ **Unable to Scale Architecture: Virtualization, Batch Processes**
- ◆ **Development System is Outdated; Difficult to Test**

# SAP Customizations - Reduction

Object Type Description	Object Type	Total	NEW Total	Reduction
AREA MENU	AMEN	2	2	0%
BDC PROGRAMS	BDCP	410	20	95%
BUSINESS OBJECTS	SOBJ	9	8	11%
CLASS POOLS	CLAS	13	13	0%
DATA ELEMENT	DTEL	1,019	968	5%
DOMAIN	DOMA	443	421	5%
FUNCTION GROUP	FUGR	150	137	9%
FUNCTION MODULE	FUNC	616	575	7%
INCLUDE PROGRAMS	INCL	2,158	557	74%
INTERACTIVE REPORT	IRPT	547	209	62%
LOCK OBJECTS	ENQU	11	11	0%
MATCHCODE OBJECTS	MCOB	6	6	0%
MESSAGE CLASS	MSAG	41	39	5%
METHODS	METH	51	48	5%
MODULE POOL	MOPL	85	8	91%
PARAMETER	PARA	3	3	0%
PRINT PROGRAM	PRPT	61	15	75%
REPORT PROGRAM	REPT	2,473	329	87%
SAP SCRIPTS	FORM	115	104	9%
SMART FORMS	SSFO	8	8	5%
STRUCTURES	STRU	357	325	9%
SUBROUTINE POOLS	SUBR	10	9	10%
TABLES	TABL	374	351	6%
TRANSACTIONS	TRAN	1,164	475	59%
VIEWS	VIEW	68	65	5%
WORKFLOW DEFINITIONS	PDWS	2	2	0%
WORKFLOW TASKS	PDTS	2	2	0%
<b>Totals</b>		<b>10,198</b>	<b>4,710</b>	<b>54%</b>
<b>High Impact Total</b>		<b>5,286</b>	<b>1,060</b>	<b>80%</b>

There are some 27 different categories of customizations (or custom objects) for which ADI has objects created, totaling just over 10K

6 of these categories have a somewhat more substantial impact to upgrades/support due to their code nature  
**BDCP, FUGR, INCL, MOPL, REPT, SUBR**

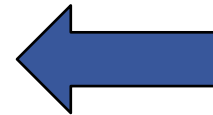
It is conceivable to reduce the overall ADI customizations by ~50% and those classified as higher impact customizations by over 75%

- using activity data a large % are unused
- functional re-engineering provides decommission opportunities
- the DRM/CRM project will remove a portion

# Customizations - Benchmark

Industry	#Objects	REPT	FUGR	MOPL	SUBR	INCL
<b>ANALOG DEVICES (AFTER)</b>	<b>1,060</b>	<b>349</b>	<b>137</b>	<b>8</b>	<b>9</b>	<b>557</b>
Education Average	1,958	431	95	52	2	1,379
Engineering Average	3,405	782	133	18	27	2,445
Media Average	3,870	2,113	96	28	2	1,633
Communications Average	4,543	910	296	21	0	3,316
Transport and Logistic Average	4,610	932	104	45	2	3,527
Chemicals Average	4,620	717	290	46	20	3,547
Retail Average	4,690	1,098	233	43	25	3,291
Consulting Average	5,094	1,228	312	31	5	3,519
<b>ANALOG DEVICES (BEFORE)</b>	<b>5,286</b>	<b>2,883</b>	<b>150</b>	<b>85</b>	<b>10</b>	<b>2,158</b>
Government Average	5,346	1,916	156	136	0	3,138
Aerospace & Defense Average	5,519	975	283	61	73	4,128
Other Average	5,905	1,390	241	86	13	4,175
Automotive Average	6,488	1,415	333	50	41	4,649
Manufacturing Average	6,660	1,774	324	74	41	4,446
Finance Average	6,868	920	366	49	110	5,423
Healthcare Average	7,445	922	139	28	14	6,342
Telecommunication Average	7,868	2,559	334	79	92	4,803
Professional Services Average	8,838	799	341	41	84	7,573
Oil and Gas Average	9,174	2,118	445	113	20	6,479
High-Tech Average	13,144	2,794	737	73	0	9,539

Object Type Description	Object Type	Total	NEW	
			Total	Reduction
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Data was provided by Smartshift and Infosys on their top 125 SAP customers and what levels of customization they have in these high impact areas

(note BDCP number from previous slide folds into REPT)

Grouped by industry ADI falls in the middle as it stands today (**before**)

After the successful completion of our planned re-engineering phase and upgrade ADI could move to the top of this list (**after**)

**Currently At 1800 Custom Objects**

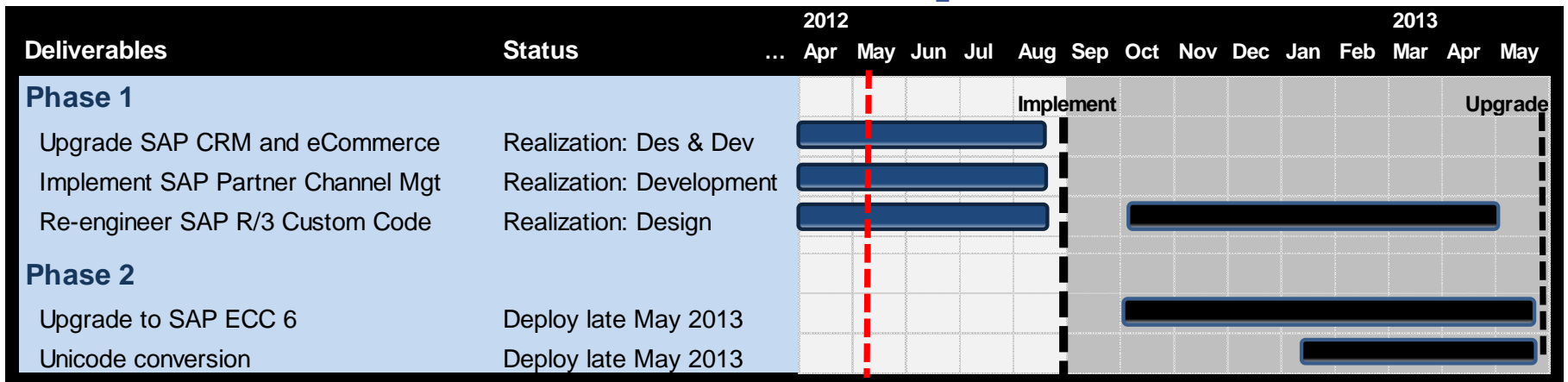


# SAP Transformation: Finalized Goals / KPIs

- ◆ **Reduce Support and Infrastructure Costs by 20%:**
  - Remediation Tools
  - Testing Process and Tools (Release Strategy)
  - Reviewing ADI Developed Solutions to Current SAP Functionality
  - Assumes Merge HCM with New ECC6
  - \$400K Reduction
- ◆ **Current with SAP releases:**
  - Time to Deploy Service Packs/Upgrades: < 3months
  - Target 2 Packs a Year – Part of Quarterly Releases
  - Sustainable Test Environment
- ◆ **ADI Developed Objects Target Reduction:**
  - SAP Modifications = 0
  - Clone Programs = 0
  - Unused Programs/Code = 0
  - Reduce Overall ADI Custom Objects by 40%
  - Reduce High Impact Custom Objects by 75%



# SAP Transformation – Scope



## Phase 1 Aug/Sep 2012

- ◆ **Partner Channel Mgt PCM implementation**
  - Convert existing DRM to PCM
- ◆ **CRM 7.0 eCommerce implementation**
  - Rewrite Online Samples and Orders
  - Upgrade Online Quoting / Customer Portal
- ◆ **R/3 Re-engineering**
  - Re-engineer Select Business Processes
  - Remove 119 SAP Mods and Clones
  - smartShift UNICODE and 4.7 Remediation
  - Certify “KEEP” custom programs
- ◆ **Basis Support Packs - 26 to 30**
- ◆ **Testing (Manual & Worksoft)**

## Phase 2 Planning

- ◆ **R/3 to ECC 6.0**
  - Upgrade Oct-2012 to May-2013
  - smartShift Full Remediation to ECC 6.0
  - IDOC upgrade (From 3.1H to ECC6)
  - Mods and Clones requiring ECC 6.0
  - Review of User Exits and Functional Customizations
  - Testing (Manual & Worksoft)
  - Unicode Conversion
- ◆ **Master Data (Generics, Table rollups, DAR)**
- ◆ **Channel Mgt PCM: Backlog & Bookings**

# Current Struggles with Testing

- ◆ **Limited Functional Knowledge (Business and IT)**
- ◆ **Dependency on Few Resources to Test**
- ◆ **More Complex Application Integrations**
- ◆ **Stale Data in our Development Environment**
- ◆ **Testing Same Processes Multiple Times for Different Projects**
- ◆ **“Suspect” Testing (Over Testing and/or Under Testing) – Burns Valuable Time and Introduces Risk**
- ◆ **Not Consistent With Documenting Test Cases – Quickly Out of Date and Hard to Maintain**
- ◆ **Unintended Changes Caught Late in Cycle – Delays Project**

# Automated Testing – Why?

- ◆ **Reduced Time to Complete Regression Testing**
- ◆ **Less Dependent on Limited Resources to Test (Regression)**
- ◆ **Allows Key Functional Resources to Focus on Meaningful Test Scenarios**
- ◆ **Creation of Test Data**
- ◆ **A Tool for Knowledge Transfer**
- ◆ **Key item as Part of a Release Strategy**

# Automated Testing – Tool Evaluation

## Worksoft Certify

### ◆ Pros

- Easy To Use / Maintain
- Codeless
- Doesn't Need to be IT
- Has Some Limited Testing Capabilities Outside of SAP
- Mitigate Risk With Upgrades Through Automated Impact Analysis

### ◆ Cons

- No Test Management (can be used with QC or Sol'n Mgr)
- Not as Robust an Offering Outside of SAP

## HP QTP

### ◆ Pros

- Tied in with Solution Manager
- Extensive Testing Suite
- Already Use LoadRunner
- Can Be an Enterprise Testing Tool

### ◆ Cons

- Requires IT Development to Maintain - Coding
- Difficult to Upgrade / Maintain



# Worksoft POC

## ◆ Requirements

- **Can robust tests be created by business analysts?**
- **Can change be identified and tests updated without programming?**
- **Are tests reusable?**
  - ◆ Upgrades, support packs, work requests and projects
  - ◆ Across systems (development, qa, etc..)
- **Can cross-platform tests, e.g. SAP GUI, SAP Portal, Web, Unix, be created by business analysts?**
- **Ease/difficulty of managing test data?**
- **How is business process documentation created?**

## ◆ POC Timeline

- **3 Days**
- **4 users (2 Business / 2 IT)**
- **Plan: Create tests in ADI's environment**
- **Test Development done by both Worksoft and ADI**

# POC

<p>◆ <b>Scope</b></p> <ul style="list-style-type: none"> <li>● Create Price Quote, Contract, Order, Shipment, Billing</li> <li>● SD Claim Validation Test</li> <li>● Validate cross-platform with 3 smaller tests</li> </ul>	<p>◆ <b>Results</b></p> <ul style="list-style-type: none"> <li>● Create Price Quote, Contract, Order, Shipment, Billing</li> <li>● SD Claim Validation Test</li> <li>● Validate cross-platform capability in Unix and web</li> </ul> <p>◆ <b>Plus</b></p> <ul style="list-style-type: none"> <li>● Data clean up for Quote to Invoice</li> <li>● eQuote</li> <li>● <b>Create and ship stock transport order</b></li> <li>● <b>Create quote and approve in SAP</b></li> <li>● <b>Change customer region</b></li> <li>● <b>More ...</b></li> </ul>
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**Goal**

Total	180 steps
Worksoft	100 steps
ADI	80 steps



**Results**

Total	649 steps
Worksoft	198 steps
ADI	<del>451 steps</del> <b>517</b>



# More Results

- **2 End to End Scenarios**
  - **Quote to Invoice**
    - Span multiple SAP roles (multiple logins)
    - 308 steps
  - **eQuote to Claim**
    - Span SAP GUI and web
    - Created Idoc in SAP GUI
    - 237 step



# Analog Team Accomplishments from POC

- ◆ **Used Advanced Logic**
- ◆ **Created Data Driven Tests**
  - **Created Recordsets in Certify**
  - **Randomly selected data**
- ◆ **Passed Result From One Test to Another and Across Platforms**
- ◆ **Read Expected Results From Popup and Screen Messages**
- ◆ **Created Tests With Y Transactions**
- ◆ **Automated Data Clean Up With Test**
  - **Clears Data After Quote to Invoice Test**
  - **Quote to Invoice Repeatable**
- ◆ **Identified Change**
- ◆ **Updated Tests**

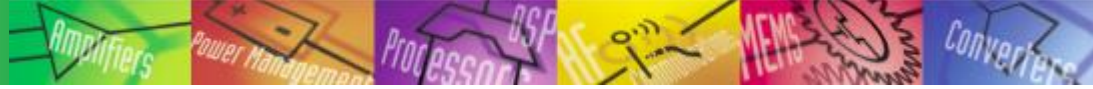




# Worksoft POC

## ◆ Requirements

- **Can robust tests be created by business analysts?**
  - ◆ Yes, with deep business knowledge and some technical knowledge of SAP
- **Can change be identified and tests updated without programming?**
  - ◆ Yes, with automated impact analysis tool called Certify Impact
- **Are tests reusable?**
  - ◆ Yes
- **Can cross-platform tests, e.g. SAP GUI, SAP Portal, Web, Unix, be created by business analysts?**
  - ◆ Yes (we were successful taking a quote from eQuote into SAP and back)
- **Ease/difficulty of managing test data?**
  - ◆ Effort saving – find, refresh, manage data easily
  - ◆ Permits more data variations for each test / greater test coverage
- **How is business process documentation created?**
  - ◆ Automatically creates business documentation



# Challenges with Automated Testing

- ◆ **Executive Buy In**
  - Trouble Presenting ROI to Executive IT Staff
  - “Will We Really Use It”
- ◆ **Planning, Planning, Planning**
  - Toughest Part on Setting Up Automated Testing is Determining What to Automate and What to Keep Manual
  - How to Set the Scripts Up
- ◆ **Making The Time to Do the Create/Maintain Scripts**
  - Not the Only Job We Do – No Formal Dedicated Testing Team
- ◆ **Incorporating Into New Applications**
  - Access to the New System Isn’t Until Development is Done and Testing Has Begun
- ◆ **Total Mindset Change**
  - Getting Folks to Change the Way They Think About Testing
  - Incorporating it Into Our Release Strategy



# Current Plans

- ◆ **Worksoft Team Developed**
  - 12 Users Trained in Certify for SAP
  - HTML Training Planned for July
  - Three Core Leaders to Assist and Manage Scripts
  - Governance Process Being Set Up
- ◆ **SAP Transformation Phase 1**
  - Limited Test Scripts for PCM / eCommerce
  - More Automated Testing for R/3
  - Currently Have 100 Scripts Completed
- ◆ **SAP Transformation Phase 2**
  - Use of Automated Testing in all SAP Environments for Regression Testing of Upgrade