INTEGRATE. AUTOMATE. OPTIMIZE. COLLABORATE.

Presentation Engineous
IBM/Tendances Logicielles : Automne 2006

Hassan Oubensaid

Engineous Software Inc.

Michigan

New York / NJ

Nottingham, UK

California

Ohio

Massachusetts

Munich, Germany

Georgia

Delaware

Paris, France

Seoul, Korea

Florida

Toulouse, France

Tokyo, Japan

Headquarters
Research Triangle Park
Cary, NC

14 offices worldwide
93 Employees

PIDO Process Integration / Design Optimization

◆ **Market leader**
  - ➤ **Over 55% market share in US**
  - ➤ **Over 75% market share in Asia**

◆ **Proven track record**
  - ➤ **Over 150 blue chip customers deploy iSIGHT / Engineous solutions**
  - ➤ **Multiple awards received for technology excellence (PACE, Industry Week, Aviation Week)**

◆ **Visionaries**
  - ➤ **Developing the next generation of enterprise collaborative technology through FIPER research**

US Market Share, 2002 Daratech Report (Software License Revenue)

6% 4% 6% 8% Engineous 55% 9% 12%
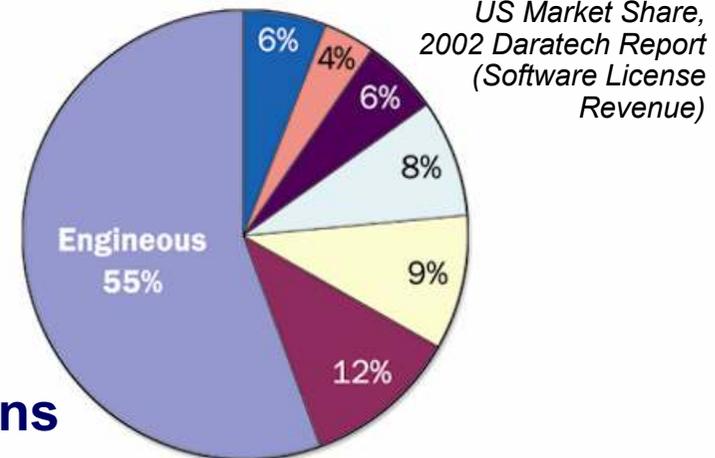
What We Do

Our goal is to help customers achieve their strategic business objectives:

- ◆ **Enhance engineering creativity and innovation**
- ◆ **Improve product performance, quality and reliability**
- ◆ **Reduce design, manufacturing, and service costs**
- ◆ **Maximize agility to respond to customer needs**

Resulting in:
- ➢ **Accelerated time to market**
- ➢ **Improved competitive advantage**
- ➢ **Market leadership**
- ➢ **Increased profitability**

We Have a Solid, Global Customer Base

Aerospace

- Boeing
- Bombardier Aerospace
- EADS Airbus GmbH
- EADS Military Aircraft/DaimlerChrysler
- GENCORP Aerojet
- General Dynamics Armament Systems
- German Aerospace Center, DLR Institute
- Goodrich Corporation
- Hamilton Sundstrand
- Institute of Space and Astronautical Science (Japan)
- ITT Aerospace Communication
- Lockheed Martin
- Loral Space Systems
- Northrop Grumman Technical Services, Inc

Automotive

- Autoliv France
- BMW
- Bosch Automotive
- Bridgestone/Firestone
- Daihatsu Motor Co., Ltd
- DaimlerChrysler
- Delphi Packard Electric
- Ford Motor Co.
- Fuji Heavy Industries
- General Motors Corp.
- Harley Davidson
- Hyundai Motors
- Jaguar
- Mazda Motor Corp.
- Mitsubishi Motors Corp.
- PSA Peugeot Citroen
- Navistar International
- Nissan Motor Co.
- Porsche
- Renault
- Toyota Motor Corp.
- Volvo

Industrial Mfg.

- 3M Company
- Baukencht Hausgerate
- Carrier Corporation
- Caterpillar
- Corning Inc.
- Deere & Company
- Eastman Kodak
- International Fuel Cells
- Kobe Steel Ltd.
- Ladish Company
- Nippon Sheet Glass Co.,
- Otis Elevator
- PPG Industries
- Procter & Gamble
- Sekisui Chemical, Ltd.
- Solutia Inc.
- Sumitomo Chemical Co.
- Swagelok Company
- The Trane Company
- United Technologies RC

Electronics

- Black & Decker
- Canon
- Computer Sciences Corp
- Emerson Electric
- Fuji
- Hitachi Ltd
- International Fuel Cells
- Matsushita Electric Industrial
- Mitsubishi Electric Corp.
- Motorola Cellular Subscriber Group
- NEC
- Raytheon Systems ARL, MARC
- Samsung
- Schneider Electric Grenoble
- Seagate Technology
- Sony Corporation
- Toshiba Corporation
- Western Digital
- Whirlpool (Bauknecht)
- Xerox

Proven Results

Engineous customers have saved millions of dollars on single project applications.

◆ **General Electric**

➢ **Saved $250,000 per engine** in manufacturing costs by optimizing the GE90 turbofan – **over $100,000,000 based on sales to date**

➢ **Saved $14.7M in launch costs** by reducing weight of core shield subsystem for SP-100 nuclear satellite **by 15%** (147 kg)

➢ **Reduced energy costs by 15%** for new Halogen-IR lamp and **increased brightness by 48%** while **reducing design time from 1 year to 4 weeks**

➢ DC motor design time **reduced from 120 hours to 1 hour** through design process automation

➢ Transformer marketing quotation process automation **saved $900K/year and allowed one day turnaround on quotes**

Proven Results (cont.)

- **Boeing Reusable Space Systems**
  - **In only one week, saved $1.2M with redesign of Delta IV rocket tail service mast system**

- **General Motors**
  - **Increased safety ratings from 4 stars to 5 (highest rating) by improving crashworthiness in multiple crash modes while simultaneously reducing vehicle weight and cost**
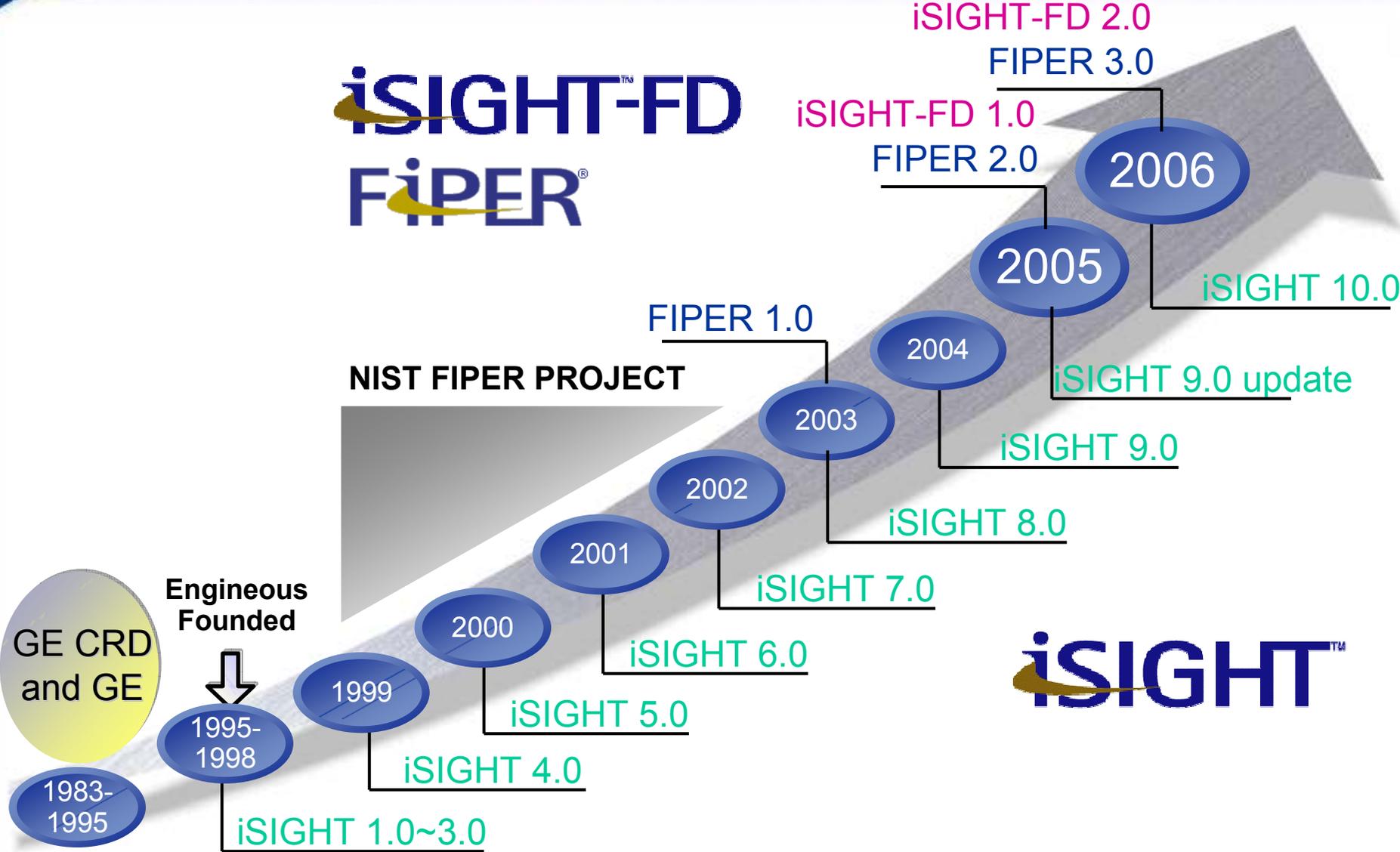
- **Honeywell**
  - **Improved fuel efficiency by 9% for automotive gas turbine-generator system and reduced design cycle time by 10X**

- **Pratt and Whitney**
  - **Five-to-one design cycle time reduction saves millions in new engine development costs**
  - **Saved many millions of dollars in manufacturing costs on F135 Joint Strike Fighter engine while improving efficiency and reliability**

Engineous Products Continue to Evolve

iSIGHT-FD 2.0
FIPER 3.0

iSIGHT-FD

iSIGHT-FD 1.0
FIPER 2.0

FiPER

2006

2005

iSIGHT 10.0

FIPER 1.0

NIST FIPER PROJECT

2004

iSIGHT 9.0 update

2003

iSIGHT 9.0

2002

iSIGHT 8.0

2001

iSIGHT 7.0

Engineous Founded

2000

iSIGHT 6.0

GE CRD and GE

1999

iSIGHT 5.0

iSIGHT

1995-1998

iSIGHT 4.0

1983-1995

iSIGHT 1.0~3.0

Engineous software

Products Designed To Work Together

◆ **FIPER: Development Infrastructure**

  ➤ **Integrate, share and execute product applications across a global network**

  ➤ **Key components: Application Control System (ACS), shared library, station framework**
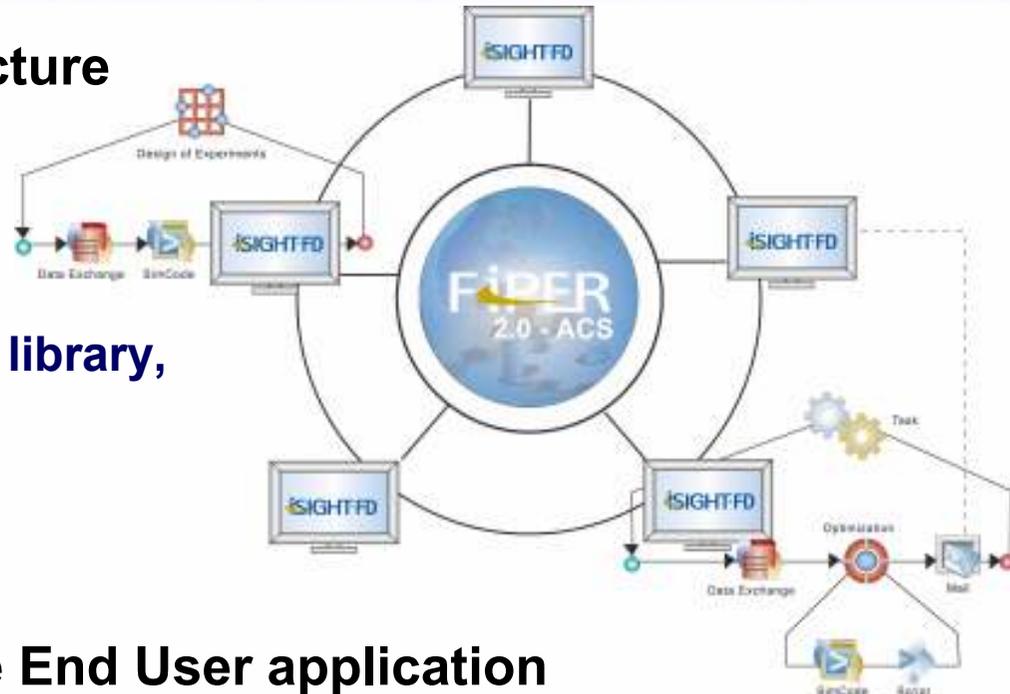

◆ **iSIGHT/iSIGHT-FD: Standalone End User application**

  ➤ **Desktop productivity tool for design automation and optimization**

  ➤ **Key Components: Powerful design drivers like Pointer, MOGA, DOE, DFSS , optimization, Monte Carlo, accurate approximation including response surface models, radial basis functions**

  ➤ **Workflow created with iSIGHT-FD can be seamlessly integrated into an enterprise-wide collaborative design environment by connecting with a FIPER ACS.**

iSIGHT-FD Structure

Design Gateway
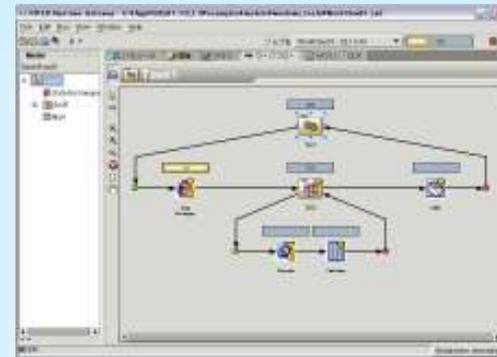
Build Workflow Model
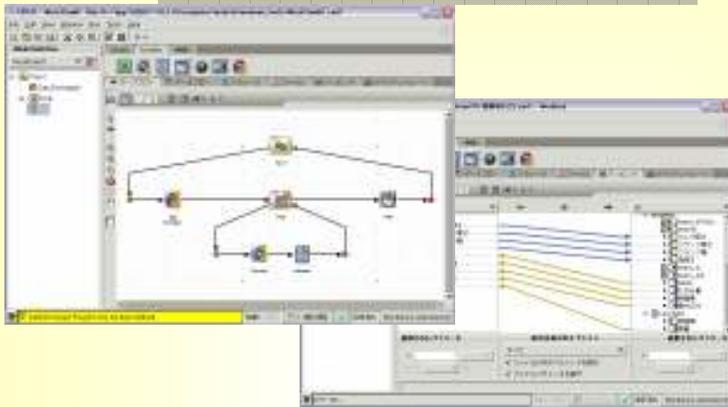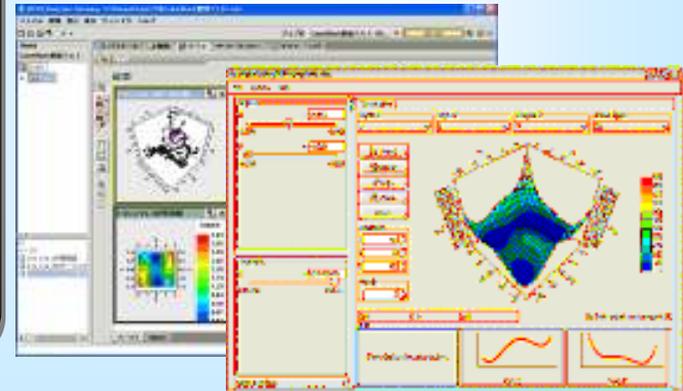
Components

### Design Drivers

Runtime Gateway

Run Workflow Model

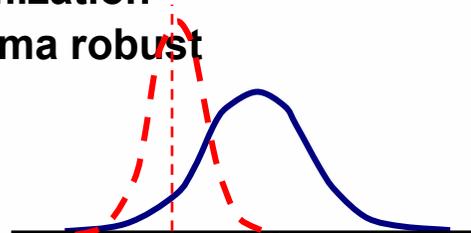### Visualize Data

Numerical Techniques on top of your workflows

- Central Composite
- Full Factorial
- Taguchi Array
- Latin Hypercube
- Parameter
- Database
- 3rd Party code coupling

- Monte Carlo
- Taguchi Robust Design
- Reliability Analysis
- Reliability-based Optimization
- 6-Sigma robust

Design of Experiment

Optimization

Quality Engineering

Approx. Models
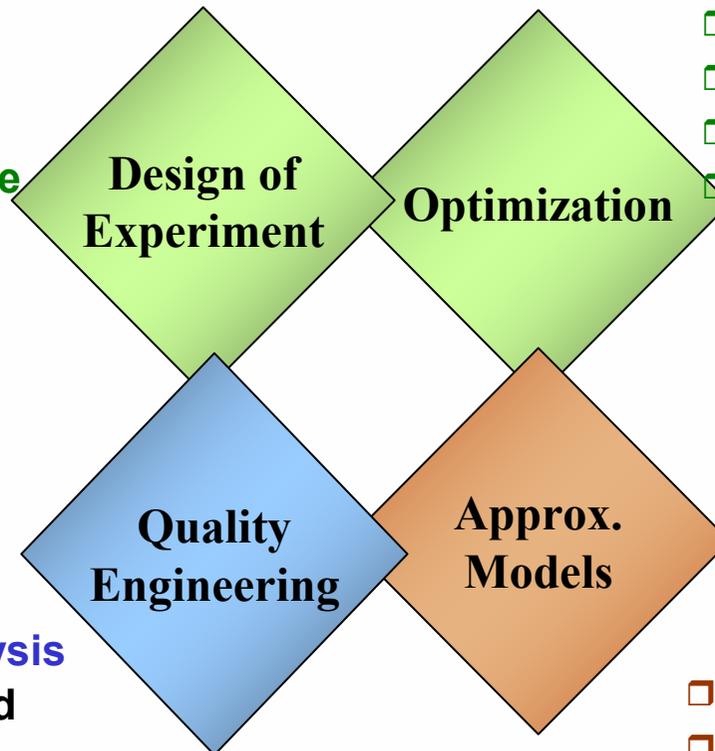
- Gradient-based (9)
- Genetic (3)
- Mixed Variable (2)
- Rule-based (1)
- 3rd Party code coupling

- Taylor series
- Response Surface
- Models
- Kriging
- Variable complexity

Software Packaging

- **iSIGHT-FD**
  - Design Gateway
  - Runtime Gateway
  - Light Embedded Database
  - Component Generator
  - Base Components   **Expanded**
  - Solution Components

    Expanded

- **FIPER**
  - Application Control Server (ACS)*
  - User Directory (LDAP)*
  - Enterprise Database (RDBMS)*
  - Station Framework*
  - Shared Library (versioning)*
  - WebTop   **Expanded**

    Expanded

Analysis Integration

iSIGHT and FIPER Integrate Simulation Model Components

CAD Model   **CAE Model**   **CFD Model**   **Cost Model**   **DB Model**   **Math Model**

Internal Model

Fortran   Java   Tcl scripts   Unix scripts

Visual Basic   C++   Perl scripts   And more….

Integrate Virtually Any Software

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IBM Partnership

◆ **Global Strategic Partner**

- **Our agreement has just been renewed for another 3 years**

◆ **Our new FiPER product is extensively based on IBM products**

- **DB2 (Express -> Enterprise)**
- **WAS (Express -> ND)**

◆ **Currently building service offerS for key customerS**

- **Use IBM expertise for scalability, high-availability, java development**

Why DB2 ?

DB2 Simplifies Everyday Tasks
Increases Ease of Use and Reduces Cost and DBA tasks

◆ **Simplified …**
  ➢ **Installation**
  ➢ **Maintenance**
  ➢ **Backup and Restore**
  ➢ **Administration**
  ➢ **Utility Scheduling**
  ➢ **Tuning and Operation**
  ➢ **Storage Administration**

◆ **Simple and Flexible Data Organization**

Simplified Installation

◆ **Simplified Installation**

  ➤ **Reduce installation complexity**

  ➤ **Multiple instances for maintenance**

  ➤ **Better default settings**

  ➤ **Uninstall !!**

◆ **Enable Automation at Installation**

  ➤ **Enable many of the DB2 autonomic features by default**

  - **Configuration Advisor (2 second tuning)**
  - **Adaptive Self Tuning Memory**
  - **Automatic data statistics collection**

Simplified Maintenance

Everyday tasks are simply automatic!

◆ **Backup**

◆ **Table Reorganization**

◆ **Statistics Collection**

Status as of:	4/14/04 7:34 AM	⟳	Refresh
DBM State:	**Started**		Stop
Last Backup:	4/13/04 9:00 AM		Backup Database
Size:	**19 MB**		Manage Storage
Capacity:	**5316 MB**		
	☐ 1%		
Health:	**Normal**		Monitor DB Health
Maintenance:	**Fully automated**		Maintenance

No need to wonder when it's needed to run these utilities

It's Automatic!

Online maintenance window

Online automatic maintenance can occur during the following window

Time	00:00 - 05:00 (5 hours)
Days of the week	All
Days of the month	All
Activities using this window	Backup database (BACKUP), Optimize data access (RUNSTATS)

Change...

10:00
11:00
12:00
1:00
2:00

Simplified Administration

Continuous Availability – Around the Clock

- ◆ **Online Utilities - Minimize Planned Outages**
  - ➢ **Dynamic Configuration Parameters**
  - ➢ **Dynamic Bufferpool Operations**
  - ➢ **Online Index Creation & Maintenance**
  - ➢ **Online Load**
  - ➢ **In-place, Online Table Reorganization**
  - ➢ **Multi-dimensional Clustering Reorganization Avoidance**
  - ➢ **Incremental MQT Maintenance on Load Append**

- ◆ **Numerous Enhancements Minimize Unplanned Outage Impacts**
  - ➢ **Faster Tablespace Recovery**
  - ➢ **Order of Magnitude Improvements in Trace Performance**
  - ➢ **Type Two Indexes, Unlimited Active Log Space, Log Mirroring**

- ◆ **And many more…**

Simplified Utility Scheduling

Self-tuning eliminates impact concerns

◆ **Simpler Workload Management**

  ➢ **Automatically adjusts to desired level of utilization**

◆ **Automatically Controls Impact**

  ➢ **Allows better system utilization under mixed workloads**

  ➢ **Allows resource-intensive utilities to run online**

    • **Backup, Rebalance, Runstats**

Simplified Tuning and Operation

◆ **Simplified Memory Tuning - Adaptive Self Tuning Memory**
- ➢ **Works on main database memory parameters**
- ➢ **Hands-off online memory tuning**
- ➢ **Senses the underlying workload and tunes the memory based on need**
- ➢ **Can adapt quickly to workload shifts that require memory redistribution**
- ➢ **Adapts tuning frequency based on workload**

◆ **Simplified Fault Tolerance - Availability enhancements**
- ➢ **Error Toleration**
- ➢ **Error Isolation**

◆ **Design Advisor**
- ➢ **Creates design recommendations based upon workload**
- ➢ **Implementing recommendations can dramatically improve performance**

Engineous
software

Adaptive Self Tuning Memory

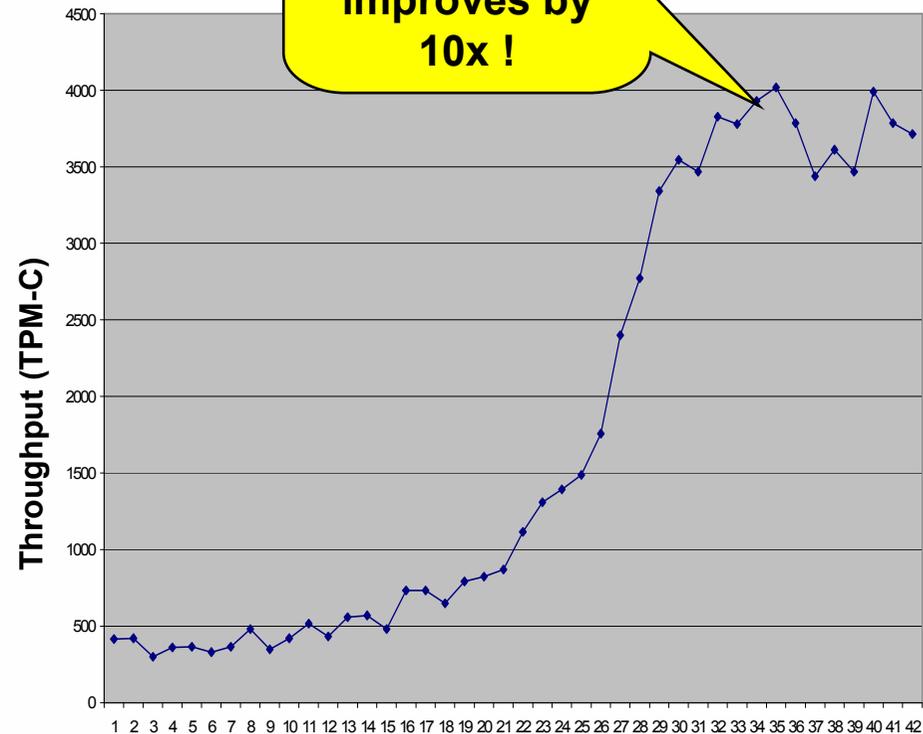*Increases business value, decreases DBA tuning tasks*

As DB2 *automatically* increases memory …
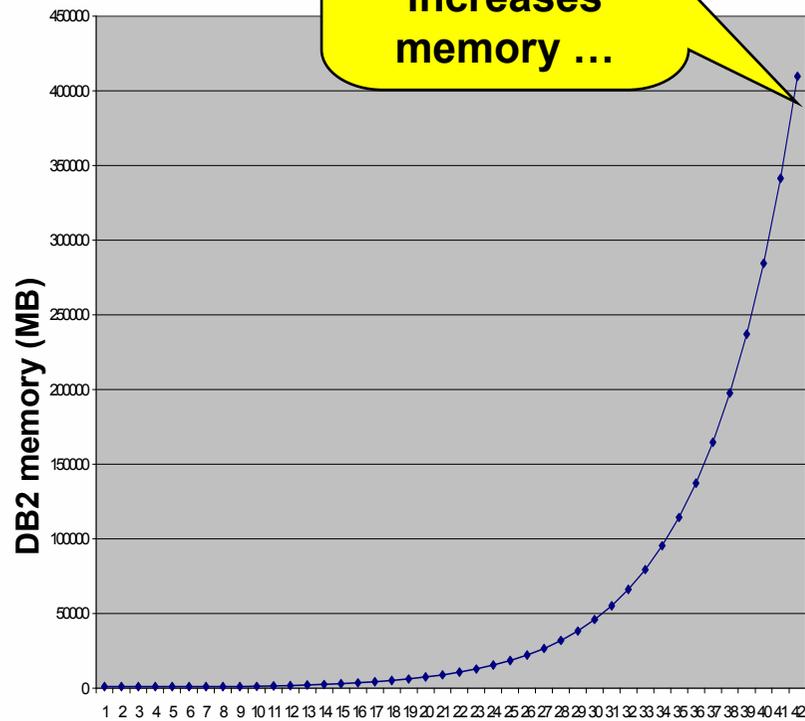
… system performance improves by 10x !

Autonomic Management

DB2 Design Advisor results

Performance improvement

6.5x Faster

DB2 Design Advisor

Recommendation summary:

- 20 new indexes

- 6 new MDC dimensions

- 4 new partitioning keys

- 2 new MQTs

Environment: 1 TB complex query workload in 4 Logical Partitions running on AIX in a 8 CPUs SMP

Simplified Storage Administration

Automatically grows storage use within policy

- **Enhanced Automatic Storage Support**
  - User specifies a group of storage devices
  - DB2 allocates and grows storage on demand
  - AUTOMATIC STORAGE table spaces
  - Built around DMS storage model
  - Add storage paths to the database afterwards
  - Redefine those storage paths during a database RESTORE

THANKS YOU !