IBM Healthcare & Life Sciences

IBM Life Sciences
Innovation that Matters

SCORE Event
IBM Forum, Madrid
22 March, 2007

Louis S. Guarino, Jr.
Worldwide Pharmaceutical Sales Executive
IBM Healthcare and Life Sciences

22 March, 2007

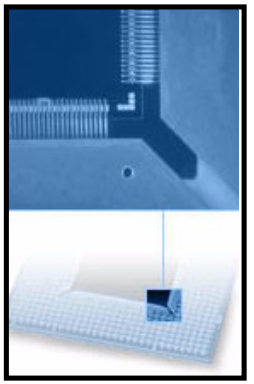
- **IBM Healthcare & Life Sciences**
- **Transformation & Information Based Medicine**
- **Convergence**
- **Solutions & Partnerships**
- **Questions**

IBM Worldwide

Worldwide Presence (170 countries)

Sales and Services

Manufacturing Plants



Labs and Research Centers

2006 Revenue	
Revenue	$91.4
Services	$48.3
Hardware	$22.0
Software	$18.2
Financing	$2.4
Investments and others	$0.5

	2006
Patents	3,651
Employees	355,766

IBM's Commitment to Healthcare & Life Sciences

Designated Life Sciences an IBM Emerging Business Oppty Unit - Spring 2000

- $100M initial investment
- 300 people

IBM Research

- IBM Computational Biology Research Center
- Deep Computing Institute
- Blue Gene Project

IBM Global Business Services

- PwC Consulting acquisition
- Pharma 2010: The Threshold of Innovation

Strategic partnerships with industry leaders

Created IBM Healthcare & Life Sciences (1/04)

- $250M Investment (2/04)
- More than 1200 professionals dedicated HC & LS

Designated Information Based Medicine an IBM Emerging Business Oppty Unit (1/04)

IBM's Commitment to Healthcare and Life Sciences
Recent History Continued

Designated Information Based Medicine an IBM Emerging Business Oppty Unit (1/04)
- Clinical Genomics and Biomedical Imaging
- Pharmacogenomics, Clinical Decision Intelligence

Acquisition of HealthLink (2005)

National Genographic Project
- IBM and National Geographic jointly gathering one of the largest collections of DNA samples to map how humankind populated the planet.

Setting new HR precedents
- IBM Will Offer U.S. Employees Electronic Records For Health Care
- IBM revises non-discrimination and equal opportunity policy – restricts genetic data

Dedication to Standards
- IBM allow royalty-free access to its patents for developers who wish to create new healthcare and education applications around open standards.

"We are at the point where we can achieve more in the next 10 years than we've achieved in the last 100, and we see in IBM a collaborator with a unique capacity to deliver expertise and innovation."

—Dr. Denis Cortese
President and CEO
The Mayo Clinic

IBM Computational Biology Center
www.research.ibm.com/compsci/compbio

IBM Healthcare and Life Sciences
www.ibm.com/solutions/healthcare

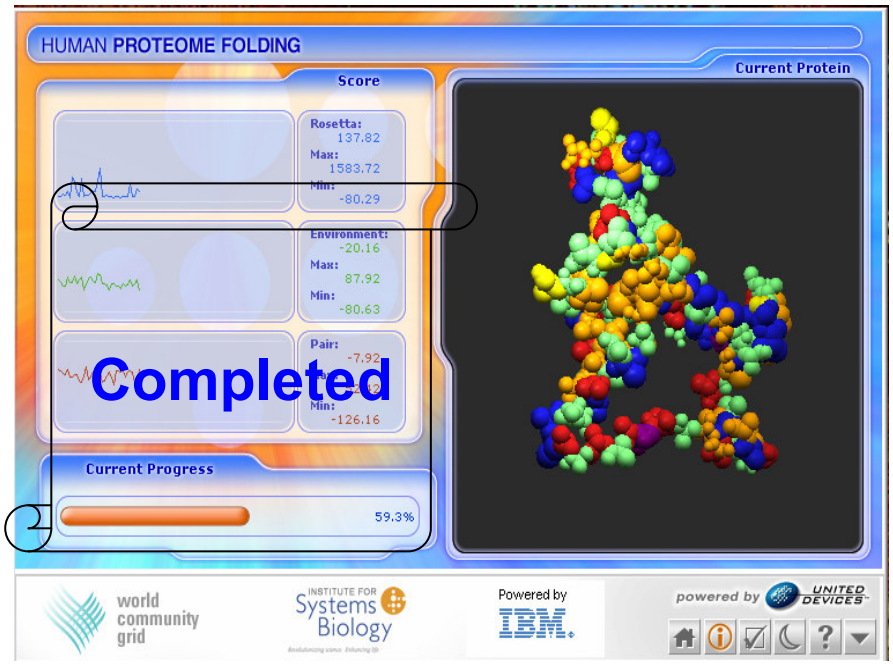
IBM Thomas J. Watson Research Center, Yorktown Heights, NY

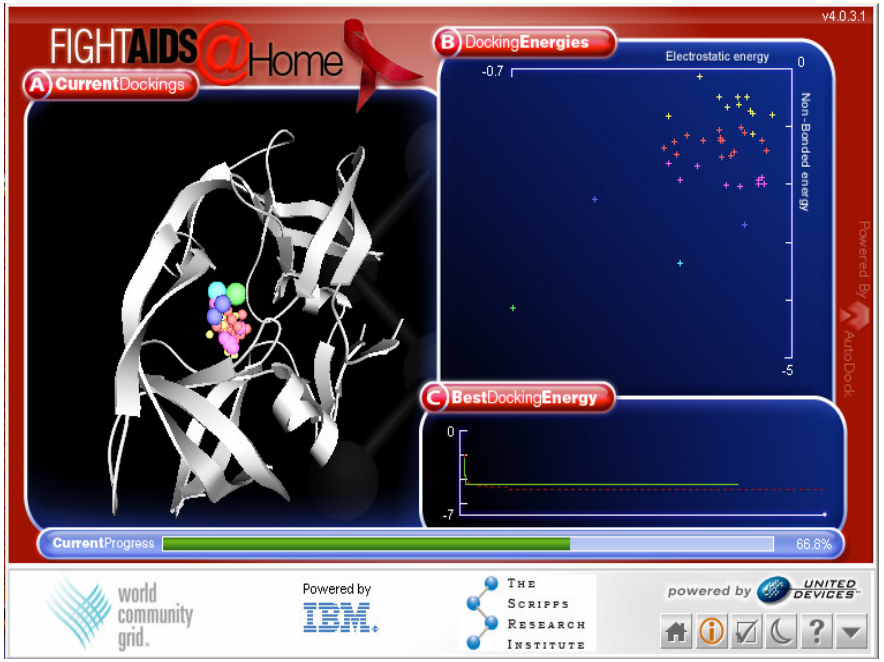
IBM Computational Biology Center

www.research.ibm.com/compsci/compbio

World Community Grid

- www.worldcommunitygrid.org
- Launched in Nov '04
- Mobilize the community
- >2400 years of computing in first 50 days
- Technology solving problems
- Advisory Board of experts in health sciences, technology and philanthropy
- RFP for new projects





- FightAIDS@Home launched Nov 21, 2005
- 30,000 additional devices in first 10 days
- Art Olson, Scripps
- AutoDOCK for HIV Protease inhibitors

IBM Continues to Make Significant Investments to Provide Innovative Thinking

Industry Points-of-View

- Comprehensive ***future-oriented point-of-views***
- ***Recommendations for client-specific actions*** to generate success

Strategic Insights

- ***The world's second-largest strategic change practice***, with over 3,000 professionals globally
- ***Institute for Business Value***, staffed by 50 full-time professionals in North America, Europe, and Asia
- Pharma 2010, the leading point of view series
- ***Over 100 in-depth strategy studies*** and related publications annually
- Focused ***client membership programs***, including up to 20 client events per year

Technology Innovation

- World's largest ***industrial research group***
- Eight labs and ***3,000+ employees*** worldwide
- ***$5 billion annual budget and five noble prizes***
- ***More than 3,400 patents*** in 2001 (over 75% more than next closest company)

Academic Partnerships

- Collaborative ***research with leading institutions***, around the world
- Professional staff with ***teaching positions*** at key institutions
- Joint ***publications and industry forums***

Providing a fusion of business insight and technology

IBV Life Sciences Inventory

IBM's Life Sciences thought- leadership is informed by our 'future agenda' series, Pharma 2010 and Healthcare 2015

The Pharma 2010 series

Pharma 2010: Next Steps

R&D

Healthcare 2015

Other PoVs

Transformation & Information Based Medicine

Two Industries in Transformation

The healthcare industry is being pushed towards crisis, fueled by unrelenting pressures such as cost, quality and access…

Five drivers make healthcare fundamentally different from the past

Globalization

- Continued shift of healthcare delivery from a local setting to an international one
- Global financial competition will limit government spending on healthcare

Aging and overweight populations

- Old people now outnumber young people, increasing the demand for healthcare
- Overweight individuals now outnumber those who are underweight

Consumerism

- Consumers will become more demanding as they bear greater financial burden for and are more knowledgeable about the risks posed by healthcare

Diseases that are more expensive to treat

- Chronic diseases account for 60% of deaths globally, consume 75% of resources in developed countries, and is forecasted to become more prevalent
- Infectious diseases have re-emerged and often in mutated, drug-resistant forms

New medical technologies and treatments

- Medical technologies (e.g. genomics and regenerative medicine) will revolutionize risk assessment, diagnosis, and treatments
- Advanced IT will be required to take advantage of the new medical technologies

Source: IBM “Healthcare 2015: Win-Win or Lose-Lose? ”

Two Industries in Transformation

Looking forward, both industries must transform to survive, let alone thrive…

Goals for Pharma

Targeted treatment solutions - diagnostic tests, drugs and monitoring devices and mechanisms, as well as a wide range of services to support - will become increasingly important

Fundamentals of the disease must be understood to increase predictability of the treatment's efficacy and safety

Product models will be predominately biologics; targeted at a defined population as well as disease-modifying and preventative in nature

Goals for Healthcare

Focus on value – Consumers, providers, and payers (employers, public and private health plans, and governments) will increasingly direct healthcare purchasing, delivery of healthcare services, and reimbursement monies based on value.

Develop better consumers – Consumers must change. Consumers will make better lifestyle choices and become wiser purchasers of healthcare services, frequently with the help of health infomediaries.

Create better options for promoting health and providing care – Consumers will increasingly seek out more convenient, effective, and efficient means, settings, and providers.

Collaborations with academic institutions adds another level of complexity to this transformation. Research tomorrow must effectively use the vast amount of information that currently sits in numerous databases across industries to understand diseases and inform best clinical practice

Source: IBM "Pharma 2010: The Threshold of Innovation" and "Healthcare 2015: Win-Win or Lose-Lose?"

Two Industries in Transformation

... yet the pharmaceutical industry is still working with the "blockbuster" business model which is over 20 years old

Pharma revenues are being exposed as leading product patents expire and R&D pipelines cannot sustain required sales growth

R&D remains costly and inefficient

- Only one in 10,000 molecules get to market
- Drug discovery takes 6.5 years, drug development takes 8 years
- Late stage attrition is high as 45% of drugs in clinical trial fail in Phase 3

Safety-based drug withdrawals over the last 6 years account for combined sales potential in excess of US$ 8 Billion

The **threshold of innovation is rising**

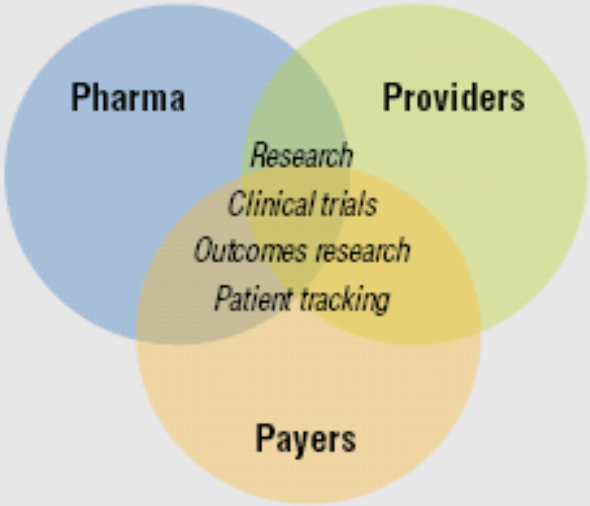
New products must have better efficacy, be safer, and be more cost effective than their generic and branded competitors

This is led by payers, providers, and consumers

Source: IBM Pharma 2010: The Threshold of Innovation; IBM Institute for Business Value

So how does this herald the need for convergence and interoperability?

The overlapping information requirements of pharmaceutical companies, healthcare providers and health-care payers.



- Understand disease and targets
- Gain regulatory approval
- Support ongoing marketing and monitor safety

- Develop and follow evidence-based standardized care plans
- Optimize the patient's lifelong continuum of care
- Identify research subjects

- For public payers, allocate resources to providers
- Define payment/reimbursement levels (e.g., formularies)
- Conduct case and disease management programs
- Perform public health studies
- Profile incentives for better outcomes and value (e.g., pay-for-performance programs)

Source: IBM Institute for Business Value.

Source: IBM Institute for Business Value

Two Industries in Transformation

…in the future, interoperability and collaboration will allow free-flow of information - critical to realizing the success of this transformation…

Information-based medicine will help drive the transformation

- It will enable collaboration and exchange of specific patient related data in clinical and epidemiologic research and provide for better care delivery
- Patients will be able to access and manage their personal health information, share critical information with their doctors, and protect the security of their personal health records
- Integrated electronic health records are central to a free-flow of information, however systems must be designed and used with research in mind

Information is an inhibitor as well as an enabler of change

- The technology exists to solve these problems, but the challenge becomes ever greater as information proliferates at unprecedented rates
- Both industries are information-intensive but are years behind other less information-intensive industries in the development of its IT infrastructure

Getting the right information in the right form to the right person at the right time will

- Help facilitate better decision-making
- Enable better value to be extracted from existing data

…and essential for achieving the ultimate aim of improved patient health

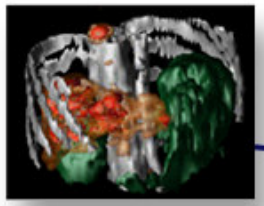
Sources: IBV “Healthcare 2015: Win-Win or Lose-Lose? ” 2006
.FasterCures white paper: “Using Electronic Records to Bridge Patient Care and Research” 2005

Information Based Medicine will require unprecedented access to diverse, integrated information

1. **Patient Information**

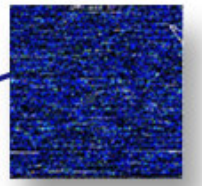
Challenges

- Volume and complexity of data
- Integrating massive volumes of disparate data
- Need for sophisticated analytics
- Growing collaboration across ecosystem

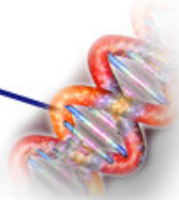


Hospital events ....admission, surgery, recovery, discharge

Access to Diverse Heterogeneous Distributed Data



Expression Arrays (various tissues)



Personal genomics

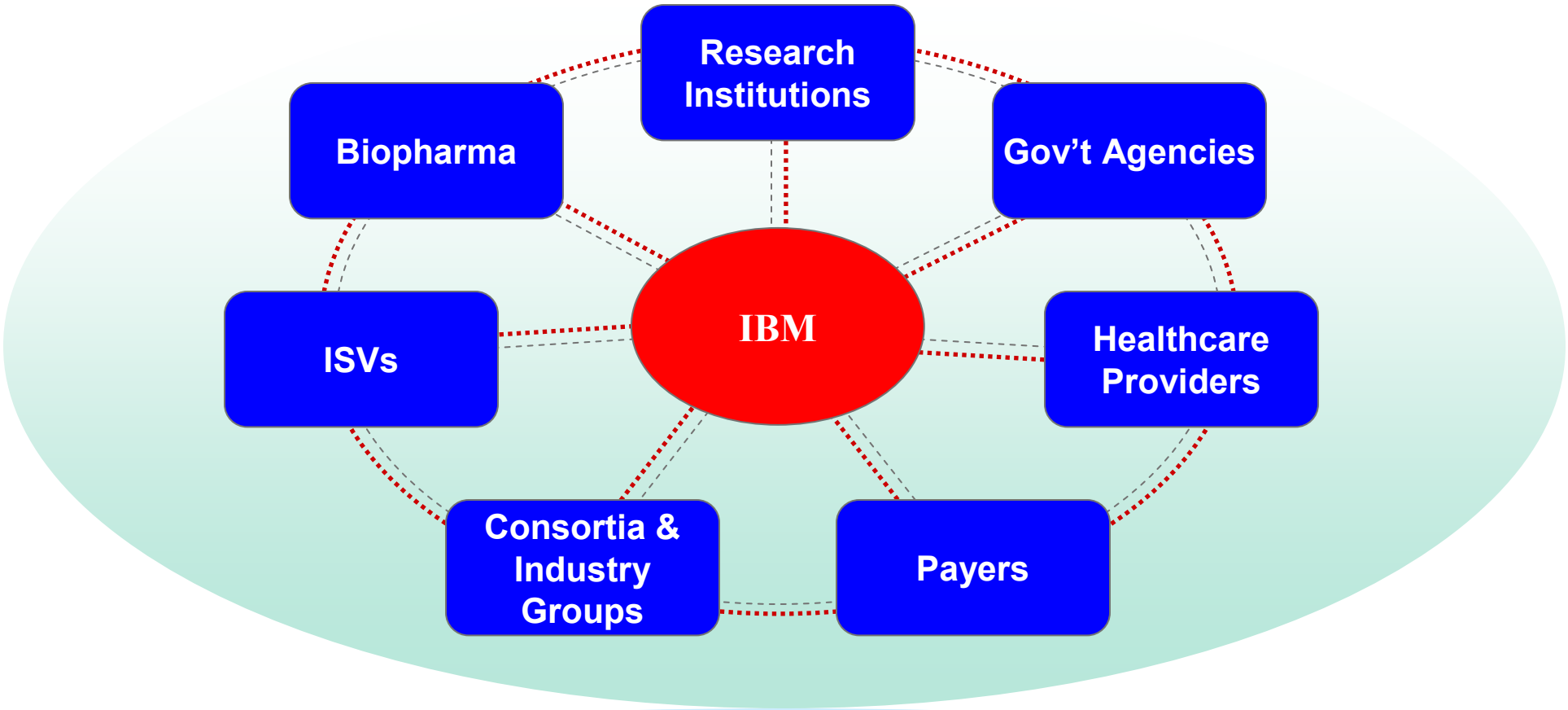
X-rays, MRI, mamograms, etc

Clinical Record

Analysis lab notes

The Healthcare Ecosystem Has Many Critical Interdependencies

IBM Healthcare and Life Sciences is Focused on Solutions for All of Them



Convergence

Governments play a crucial role in facilitating acceptance and acceleration of electronic healthcare adoption

President Bush: ***Electronic records can "help change medicine and save money and save lives,"***

Bush called for the nation to eliminate paper medical records within a decade**. … the White House said it wanted to double funding for that effort to $100 million in the current fiscal year (2005) and would ask for $125 million in the fiscal 2006 budget.**

***Washington Post, January 2005**

Danish National Board of Health Strategy for 2003-2007:

- **Empower consumers** for active participation
- Put the patient in the central position
- Make IT an integrated part of the clinical process
- IT must support healthcare
- Gain benefits from IT

* Danish National Board of Health Website

"Health Canada will be front- and-centre in the advancement of timely and trusted electronic health information and service delivery."

Health Canada will achieve this vision by:

- **transforming information** and services for on-line delivery;
- **integrating information** and service delivery methods (e.g. Internet, telephone, in-person);
- **providing national leadership** in the advancement of e-government concepts within the health community;
- **ensuring a continued trusted relationship** with Canadians by providing appropriate levels of protection for their personal information;
- **confirming** that the information and services being provided are those that are needed by Canadians;
- **working cooperatively** with its federal/provincial/territorial partners and private sector stakeholders.

*Health Canada e-gov strategy and vision

Examples of converged environments > Department or Project

Linking electronic data capture systems to electronic health records speeds data capture and data validation in clinical research using Siemens OPENlink

Problem

- Clinical research is still conducted using mainly paper based case record forms
- Process of entering and validating is time consuming and costly
- Even when electronic systems (EDC) are used to collect data – verification of source data in health records is still required and is performed manually

Solution

- Web-based system (OPENlink) links electronic health records (EHR) to EDC systems.
- A portal allows researchers to enter clinic visit data directly into their EHR. The data is simultaneously validated and stored in a research database

Benefits

- Real time data capture, validation and clean-up of data
- No need for source document verification since this is done automatically
- Real-time study progress allows corrective action to be taken where necessary – a prerequisite for adaptive trial designs

Source: Siemens Helps Streamline Clinical Trial Process http://www.webwire.com/ViewPressRel.asp?SESSIONID=&aId=20645, 9/19/2006

Examples of converged environments > Organization

Translational Genomics Research Institute (TGen) has quickened the pace of genomic research

TGen is focused on developing earlier diagnostics and smarter treatments.

Problem

- TGen's ability to managing and analyze the enormous amount of data generated by genotypic analysis
- TGen needed the flexibility to grow its processing capacity to keep ahead in the explosive growth in genomic and clinical data

TRANSLATIONAL GENOMICS RESEARCH INSTITUTE

In understanding the genomic and molecular mechanisms behind complex diseases such as cancer, knowing the elements of the genome map is akin to having all the pieces of a large and complex puzzle. For researchers, the new—and in many ways even more complex—challenge is to gain a deeper understanding of the various ways these pieces fit together.

Solution

- Technological solution combines scalable, computing horsepower with highly advanced data mining capabilities`
- A database that stores both structured and unstructured information drawn from an enormously diverse array of sources, including clinical trial data

Benefits

- TGen now has the ability to model and analyze complex biological systems using realistic datasets
  - Solution created a high-performance computing infrastructure whose capacity of 2 trillion calculations per second enables it to perform tests and analyses, which previously took years, in a matter of days reducing recycling time 99%
- Scalable architecture enables computing capacity to grow as needed, saving US$300,000 in costs

Source: IBM "TGen helps bring breakthroughs to the bedside faster with an integrated clinical genomic solution," 2005

Western North Carolina (WNC) Health Network the improves service delivery when it implements an integrated solution to share patient information

Problem

- Medical service providers face a major barrier when it comes to sharing patient records freely between facilities.
- The 16 hospitals of the WNC wanted to find a way to remove this barrier and facilitate the exchange of patient data electronically.
- *Challenge:* create a secure, reliable virtual network of patient care across the region.

Solution

- WNC launched Data Link, a clinical portal solution with real-time connections into diverse clinical systems at the region's 16 hospitals. It –
  - Builds on existing technology at the hospitals.
  - Reduces the burden on members' hospital staff by providing a hosted infrastructure.
  - Enables the creation of a regional network based on sharing virtual patient records.
  - Builds a foundation for future enhancements and linkages to national networks.

WNC HEALTH NETWORK
Providers Working Together

As one of the largest regional health information organizations in the United States, WNC has enabled participating doctors and other authorized hospital clinicians to quickly, easily and securely access patient information over the Internet in a matter of seconds.

Benefits

- The innovation solution is the first regional health information organization in North Carolina and one of the largest in North America. Benefits include:
  - Allows participating hospitals to view patient records so they can more accurately and efficiently provide treatment, without changing their existing systems and processes
  - Improves patient safety and reduces cost and errors
  - Eliminates duplication of costly tests

Source: IBM "Western North Carolina Health Network to Link 16 Area Hospitals to Electronically Share Critical Patient Information," 2006

Servico Extremeño de Salud (SES) makes major strides in patient care as it integrates healthcare information management services and systems

Problem

- SES is the public healthcare service for the regional Ministry of Health (Consejeria de Salud) in Spain and it operates the hospitals, medical centers, and central administration
  - Each hospital had its own IT solutions and only a few centers received any application support
  - Each facility had its own patient records system but the data was not accessible regionally
- *Challenge*: Integrate both patient-related and administrative processes to serve patients better

"We wanted to be able to focus more closely on our patients' needs, and to function as a single organisation. The [solution] gave us the ability to integrate medical and administrative processes in a single solution, replacing several disparate systems and providing a platform for future growth."

-- Dr. Juan Pablo Alejo, CIO for Servico Extremeno de Salud

Solution

- SES deployed a comprehensive, integrated healthcare information management system that supports and manages all business processes, including patient-related and administrative ones.
- The solution is based on the concept of a unique data repository that stores medical and administrative data in a central location (except for backup data)
  - Patients can go to any regional health center, where the doctor can view the patient's entire record

Benefits

- The new solution connects almost 13,000 professionals, with the scheduling system managing 9 million outpatient visits per year
- SES sees reduced costs of paper and other media, and improvements in clinical and administrative efficiency
- By responding more effectively to patients' individual needs, SES expects to drastically improve customer satisfaction

Source: IBM "Servicio Extremeño de Salud cares for more citizens with SAP software and IBM," 2006

Examples of converged environments > Regional

Canadian provinces are advocating the adoption of interoperable EHRs to address healthcare quality issues, such as adverse drug events

Problem

- In spite of advances in medicine, the foundation of Canadian care delivery is primarily paper-based
  - In 2005, there were ~2000 healthcare transactions per minute, many complex, and all requiring documentation and information flow
- Lack of comprehensive patient data affects the quality of care delivery
  - For every 1000 patients discharged from hospital, 90 suffer a serious problem with drugs received upon discharge

Canada Health Infoway / Inforoute Santé du Canada

Solution

- Prime Minister and the provincial/territorial premiers recognize the necessity of EHRs
  - Recommended a National Pharmaceuticals Strategy that would "broaden the practice of e-prescribing through accelerated deployment of the Electronic Health Record"
- Goal is to have interoperable electronic health record in place across 50% of Canada by the end of 2009

Benefits

- Drug Information Systems are expected to result in $3.6 billion annual savings, Canada wide, avoiding adverse drug reactions and drug compliance issues
- It has already improved care delivery: *"When VIOXX was pulled from the market, it took our practice just one hour to produce a report on patients who had been prescribed the medication, allowing us to contact every one of them the same day."* -- Dr. Sue MacLean, *Markham Family Physicians*

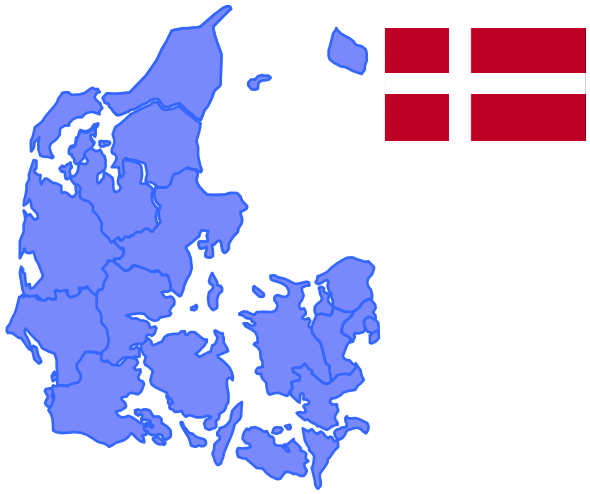
Source: Jim Mickelson "Developing the Electronic Health Record – The Canadian Context" Canada Health Infoway, 2005; Mike Sheridan "Canada Health Infoway - EHR's in the Canadian Context" Canada Health Infoway, 2005.

Examples of converged environments > National

Denmark's healthcare information exchange has saved money, improved efficiency, and laid the groundwork for improved quality of care

Problem

- In 1994, the Danish health system relied on a paper-based communications system
  - Accounted for 20-30% of administrative expenditures
  - Contributed to medical errors, duplication of services, wasted time, and poor service quality
- Numerous local and regional IT projects were created to address these challenges but they were uncoordinated and largely ineffective



Solution

- Denmark carefully realigned incentives, created an innovative culture, and maintained a balance between central and local leadership
- Denmark developed a healthcare data network linking counties, hospitals, vendors, etc.
  - A central clinical data repository stores lab results, discharge letters, referrals, etc.
  - A national healthcare portal (sundhed.dk) enables citizens to review providers' wait times, quality and accessibility, and more

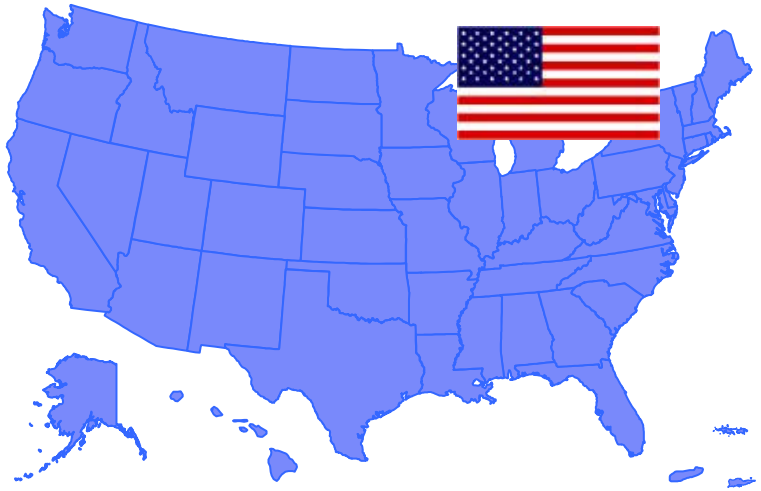
Benefits

- Use of health information exchange has reached 98% of the 3,500 GPs, a majority of specialists, all 73 hospitals, all 331 pharmacies and half of the 271 local authorities
- The network transmits 3.5M messages per month (~80% of messages in the health system)
- Anecdotal evidence suggests clinical benefits: improved adherence to care guidelines, faster exchange of results, fewer duplications, and more time for clinicians to spend with patients

Source: Gartner " Denmark's Achievements with Healthcare Information Exchange," 2006

Examples of converged environments > National

Intense industry collaboration to create an interconnected EHR record is underway in the United States



Problem

- Poor coordination of care across the continuum of care (fragmented communications and view of patient data)
- Poor information available on costs, quality, and outcomes. Patient safety concerns
- Low automation level (physician practices especially) and productivity
- Immature clinical and technical interoperability standards

Solution

Proposed “National Health Information Network” –

- Widespread adoption of interoperable electronic health records (EHRs) by 2014
- Medical information follows the consumer
- Clinicians have complete, computerized patient information
- Quality initiatives measure performance and drive quality-based competition
- Public health and bioterrorism surveillance are seamlessly integrated into care

Benefits

The national benefits of HIT have been quantified –

- Decision support tools to deploy evidence-based medicine at point of care: savings of US$350–600 per patient per year
- e-Prescribing: savings of up to US$27B per year
- CPOE: savings of up to US$40B per year
- EHR: savings of up to US$86K/provider over 5 yrs
- RHIOs: benefits 3 times the costs
- Overall, the use of technology can save US healthcare system US$70B

Source: CITL, "The Value of Healthcare Information Exchange and Interoperability" 2004.

Examples of converged environments > International

The Baltic eHealth network is Europe's first cross-border healthcare network and is currently piloting eUtrasound and eRadiology programs

Problem

- Need to improve access to high quality healthcare in rural areas
- Need to avoid doctor migration from lower-cost countries to higher-cost countries
- Shortage of radiologists and obstetricians in Denmark, Norway and Sweden
- Need to improve patient mobility by moving the data, not the patient

Solution

- Baltic eHealth Network – connecting the 3 national networks of Sweden, Norway and Denmark with additional hospital networks in Lithuania and Estonia

Benefits

- 2 full-scale cross-border pilots underway
  - eRadiology between a hospital in Denmark, Tallinn (Estonia) and Vilnius (Lithuania)
  - eUltrasound between a Swedish and Norwegian hospital
- All Danish and Swedish pharmacies now interconnected
- More than 96% of Denmark's, 90% of Sweden's and 78% of Norway's GPs are connected to the system

Source: Henning Voss & Dr Peeter Ross "Baltic eHealth – empowering regional development in the Baltic Sea Region," Baltic eHealth, 2005; "Baltic eHealth – Improving Life in Rural Areas in the Baltic Sea Region by eHealth Services," eHealth Impact, 2005.

Solutions & Partnerships

IBM offers solutions designed to help at each stage of transformation in the ecosystem

Public health	Healthcare benefits companies	Healthcare providers	Life sciences (Pharma/Biotech/Medical)	Patients
As you progress from operational excellence to infrastructure transformation, new business priorities are enabled.	IT organization and process management 1	Optimize and align IT organization, processes and investments with business objectives 2	Drive growth and achieve differentiation 3	
Steps for healthcare providers and benefits companies:	Clinical and business process optimization **Step one: Integrate and optimize** 1	Health and wellness management **Step two: Build data analytics engine** 2	Patient-centric networks **Step three: Under construction worldwide** 3	
Steps for life sciences companies:	1	Information-based medicine **Medical research, drug development and discovery** 2	Life sciences transformation **Better drug delivery at a lower cost** 3	

IBM Has Been Investing in the People, Technologies and Partnerships to Advance Translational Research

Data Capture, Management and Annotation *(Partner Solutions)*
- LIMS and other tissue management applications
- Validated/secure data transfer process

Data Integration and Management *(IBM Healthcare and Life Sciences Clinical Genomics Solution)*
- Validation of data
- Annotation, links to internal and external knowledge
- Integration with internal and external databases
- Integration of clinical and high-throughput molecular data

Security/Privacy of Data *(Multiple IBM technologies – TSM, DB2, etc., Clinical Genomics Solution)*
- Security of information comes first and foremost

Data Mining/Analysis *(Partner Applications, Clinical Genomics Solution)*
- Computational tools to support pattern discovery
- Computational tools to support association studies between disease phenotypes and molecular profiles (e.g. patient stratification algorithm)
- Computational tools to support decision-making (e.g. to determine sample size/type for analysis)

High Performance Computing *(Blue Gene, HPC Cluster, etc.)*
- Large high performance computing needs for analysis of data

NOTE: Solution/technology names in blue.

IBM addresses the needs of healthcare and life sciences companies by leveraging a large bench of experienced industry partners

IBM offering areas







Medical imaging	Healthcare provider information systems	Benefits organization claims systems	Clinical genomics	Research and development		Drug manufacturing and distribution	Life sciences sales and marketing
AGFA Cerner Emageon Fuji GE Medical IDX Kodak McKesson Philips Medical Siemens Medical Stentor	Cerner Eclipsys Eoic First Coast (Keane) IDX Lawson McKesson Meditech Misys Health Siemens Medical WebMD VHA	CSC Healthcare deNOVIS HealthTrio HSD-Perot OAO RamTech Trizetto	Affymetrix deCODE Mayo	Accelerys Affymetrix Agilent Business Objects CCG Docu-mentum Infodata Labware Medidata MicroStrategy	ProScape SAS Scimagx Siebel Spotfire Tripos Wave-function Winchester	Adobe Aegis Camstar Dassault Systems Docu-mentum Infodata Rockwell SAP SAS UMetrics	Adobe Docu-mentum Infodata Siebel Siperian SAS

New challenges are reshuffling life sciences business and IT priorities

Public health	Benefits organizations	Healthcare providers	**Life sciences** (Pharma/Biotech/Medical device)	Patients

Business objectives

Speed discovery

Solutions

- Catalyst 3-D data management for Linux® from IBM and Accelrys
- Cheminformatics from IBM and Tripos
- Clinical Genome Miner Discovery from deCODE and IBM
- Clinical genomics for biopharma-ceuticals from IBM Life Sciences
- Clinical trial management from IBM and SAS
- Data management from IBM and NuGenesis Technologies
- Grid computing for pharmaceutical companies from IBM
- IBM Corporate Information Asset Manager for Life Sciences

Facilitate compliance

Solutions

- Solution for compliance in a regulated environment
- IBM Corporate Information Asset Management

Control costs

Solutions

- ActivityBase for drug discovery from IBM and IDBS
- Archiving electronic records solution from IBM
- Computational drug discovery from IBM and CCG
- Discovery Warehouse from IBM and IDBS
- Enterprise resource planning (ERP) for life sciences from IBM
- High-performance information infrastructure from IBM
- IBM eServer BladeCenter Solution for Bioinformatics

Automate sales and marketing

Solutions

- CRM on Demand
- Customer Data Integration
- Electronic Data Capture Central
- IBM Express Life Sciences Solution – mySAP All-in-One solution

Value Driven Compliance Solution Components include Both Strategy and Execution

1. Risk Diagnostic

Identify the hazard indices for a company's product portfolio, technology platforms and site GMP systems.

2. Business Re-factoring

Identify the optimal route map, based on scenarios defined, that reconfigures assets to minimize revenue at risk and optimize supply chain performance

Setting the Strategy

Executing the Program

3. Transforming Industrialization

Build quality into products and processes using science, systems and technology to reduce risk

4. Compliance Centric Business Architecture

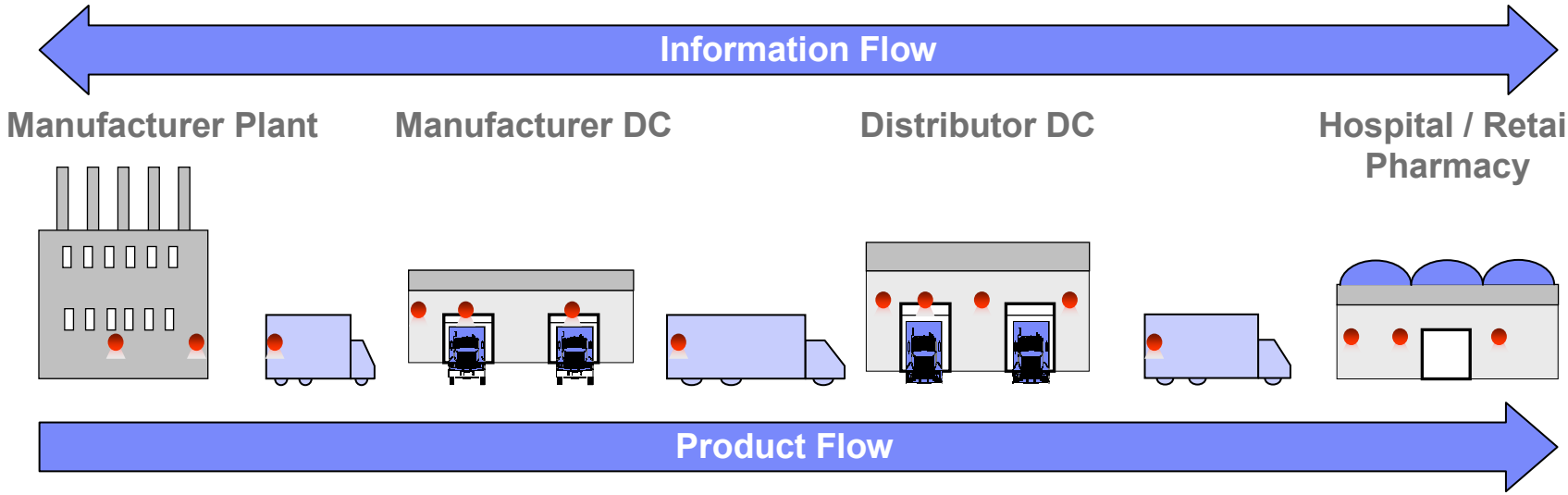
Drive a cultural revolution to embed quality into everyday operations and reduce compliance costs

5. Compliance Centric IT Architecture

Enable & sustain business models & macro-business processes are controlled using BPM technology and supported with capable and compliant functional engines and multi-layer technology architecture.

IBM RFID Solution for Pharmaceutical track & trace

Solution Scope



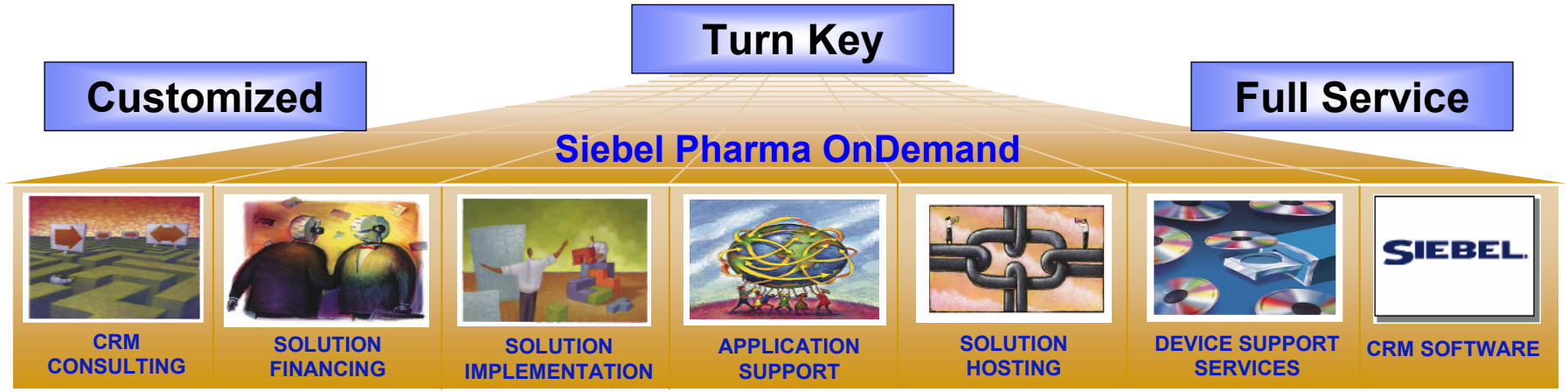
- Leverage passive RFID technology (HF & UHF) to automatically capture and track the movement of pallets, cases and *individual units* through the supply chain
  - ⇨ The what, where, when, why of each transaction

- Provide up and downstream inventory visibility through a distributed, standards based data repository (EPCIS)

RFID Read Point

Siebel *Pharma OnDemand* is an end-to-end solution tailored to the specific needs of our clients…

This solution brings together the world class capabilities of IBM Global Business Services with the robust CRM functionality of Siebel…



- CRM Strategy Development
- Siebel implementation and Upgrade Services
- Interface Development
- Syndicated Data
- Validation

- Overall Solution Financing
- Siebel Licensing Arrangements

- Solution Design
- Solution Development
- Solution Implementation

- Tier 1 and 2 Support
- Hours of Operation
- Support Languages
- Siebel Administration
- Siebel Configuration
- Interface Support
- Data Base Admin

- eBusiness Hosting
- Connectivity
- Security and Backup
- High Availability
- Regulatory Compliance

- Purchase
- Hardware Distribution
- Hardware Support
- Image Support
- End User Device Support

- Dynamic Sales Planning and Execution

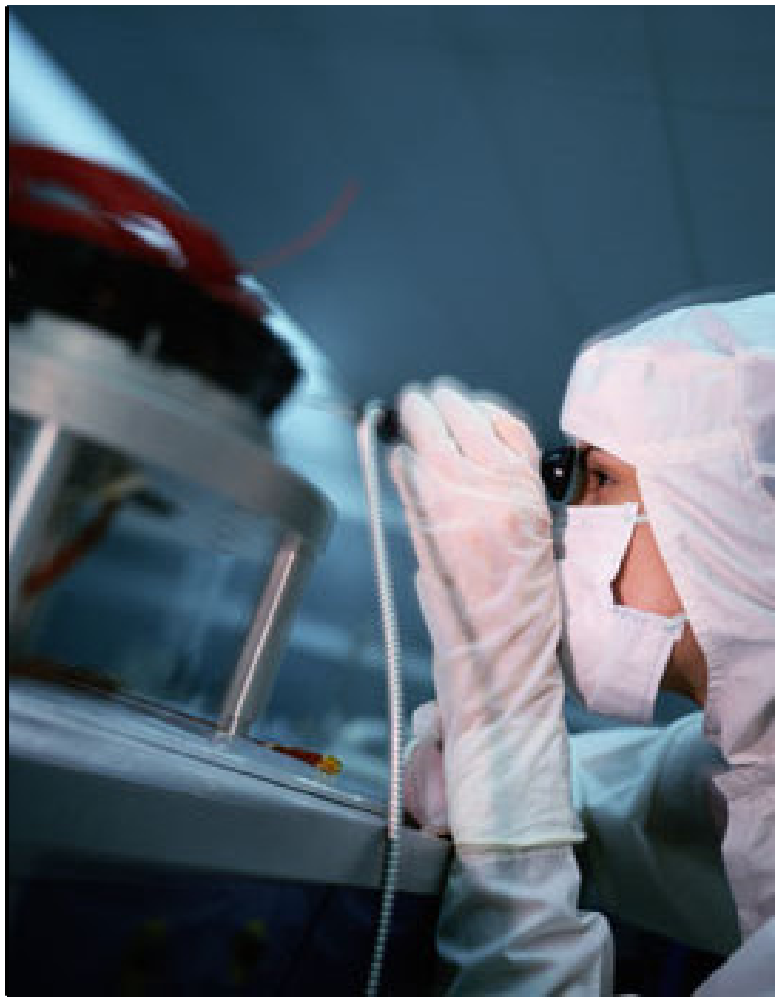
Using IBM Electronic Data Capture Solution to transform discovery and development

Clinical trials are complex and costly

- Paper-based processes
- Trials spanning multiple countries
- Increasingly strict regulatory requirements

Electronic Data Capture Solution for automated, integrated and cost-effective development processes

- Prebuilt electronic data capture hosting, provisioning and support services
- Rapid roll-outs worldwide
- Based on an open-source environment for interoperability with systems worldwide
- Supports regulatory compliance



IBM Solution for Compliance in a Regulated Environment—designed to support compliance efforts in key business areas

A regulatory process document management solution designed to provide:

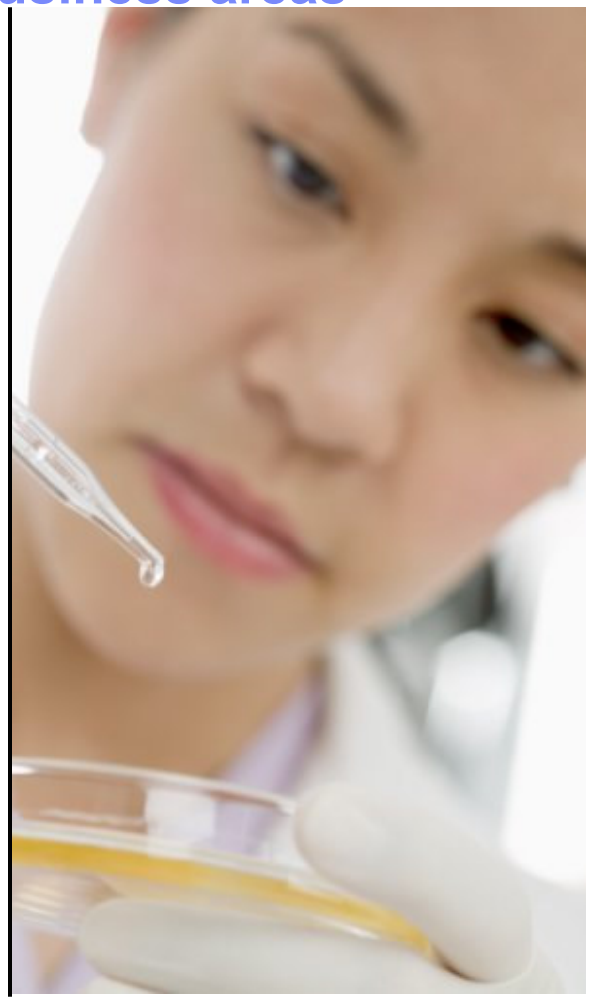
- Application integration and business process management through IBM WebSphere integration software
- Support for compliance with GxP and 21CFR11 regulations
- Documentation collaboration and management through IBM Content Manager

Designed for:

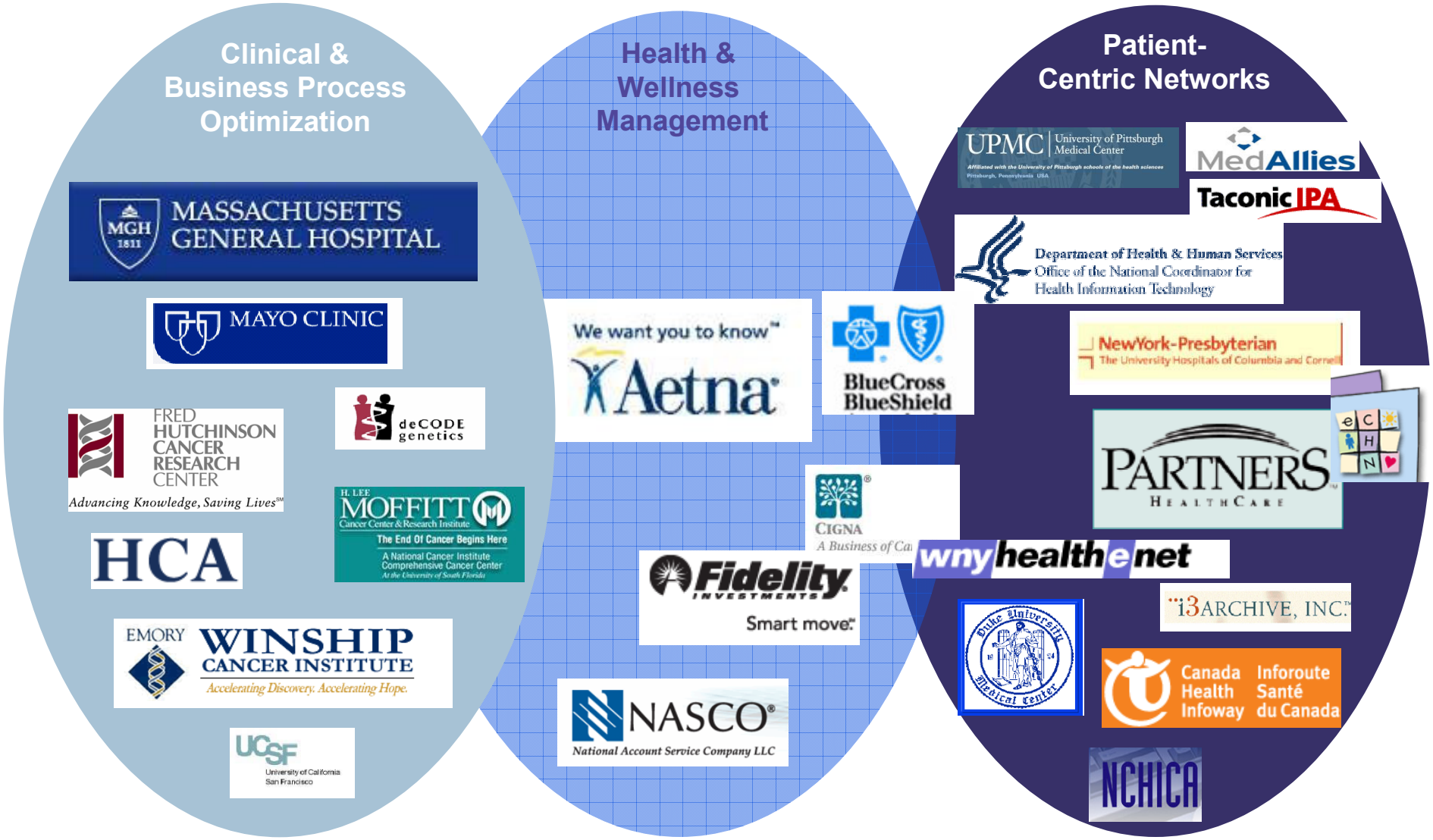
- R&D, clinical trials, manufacturing, sales and marketing, and more
- Also useful in less-regulated areas of the life sciences value chain

Offered as:

- A bundled solution including all relevant IBM software at one low, per-user price



IBM , with its partners, is very active in these areas of healthcare innovation



ON DEMAND BUSINESS™

Mayo Clinic: Transforming Patient Care

- Integration of 4.4 million patient records into a unified system with robust security and privacy
- New techniques to analyze patient records to improve diagnoses
- Deep computing power to model diseases to find cures
- New information access devices to transform how patients and physicians interact

MAYO CLINIC

"Wouldn't it be marvelous if I knew not just the exact location of the patient's cancer, but its gene characteristics, and the outcomes with the last 500 patients at Mayo with cancer in that identical location and with those identical genetic characteristics?"

– Dr. Hugh Smith, Mayo Clinic

"We are at a point where we can achieve more in the next 10 years than we've achieved in the last 100, and we see in IBM a collaborator with a unique capacity to deliver expertise and innovation."

– Denis Cortese, M.D., president and CEO, Mayo Clinic

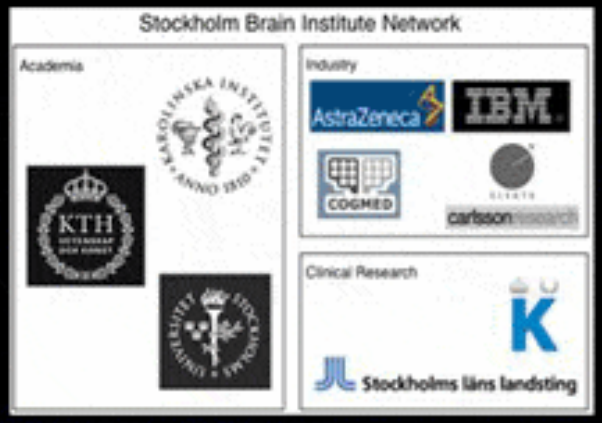
Information Based Medicine

Business Unit or Product Name

Stockholm Brain Institute with AstraZeneca

The Challenge

- Need for a system of considerable computing power that can support 10 research groups that are part of the Stockholm Brain Institute, AstraZeneca, KTH and Stockholm University



The Solution

- First IBM Blue Gene/L supercomputer in the Nordics
- First Blue Gene/L by Pharmaceutical
- SW, and Services and Joint Study Agreement with IBM Research.

The Benefits

- A computing platform which provides internationally competitive research capabilities in neuroscience research for the Stockholm Brain Institute.

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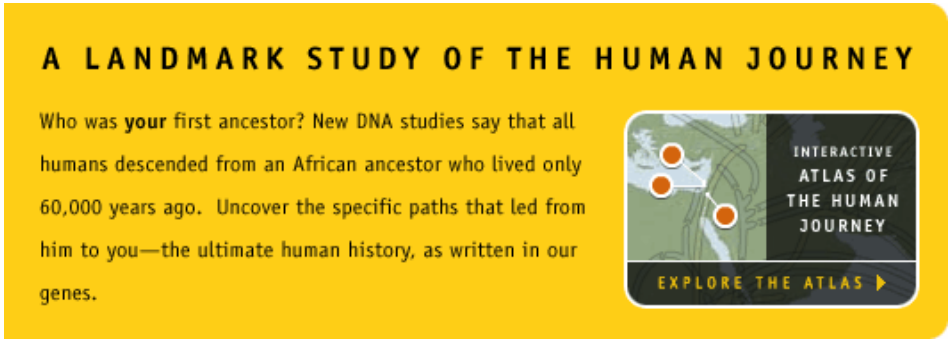
The Genographic Project: IBM and National Geographic team up for long-term to map human migrations

An international team of geneticists and IBM researchers will collect, analyze and report on the genetic roots of modern humans

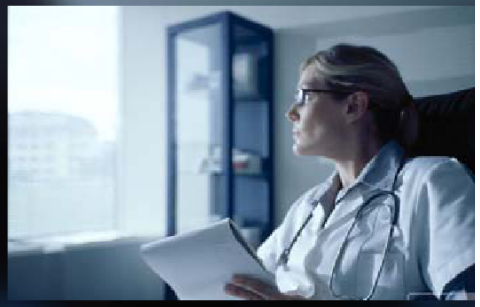
- A five-year research partnership
- Combines lab and computer analysis of DNA
- Ten global research centers
- More than 100,000 DNA samples from indigenous populations, and samples from the general public

End goal: A public database of human genetic information and a resource for geneticists, historians and anthropologists



Life Sciences Innovation

IBM Healthcare & Life Sciences



A doctor saves a patient from heart disease. 30 years before it strikes. Can you see it?

This is on demand business. Where deep analysis turns data into life-saving insight. Treatment doesn't have to wait for symptoms. Preventative treatments can be customized, based on genetic make-up. Here, medical providers predict, sense and better respond to patients' needs on demand.

At IBM, we're bringing to the table a unique combination of industry experience, deep business insight and powerful, proven, enabling technologies. Behind one clear vision, we're helping our customers drive a new standard of productivity, effectiveness and innovation. In short, delivering results. On demand business. Get there with e business on demand™

IBM

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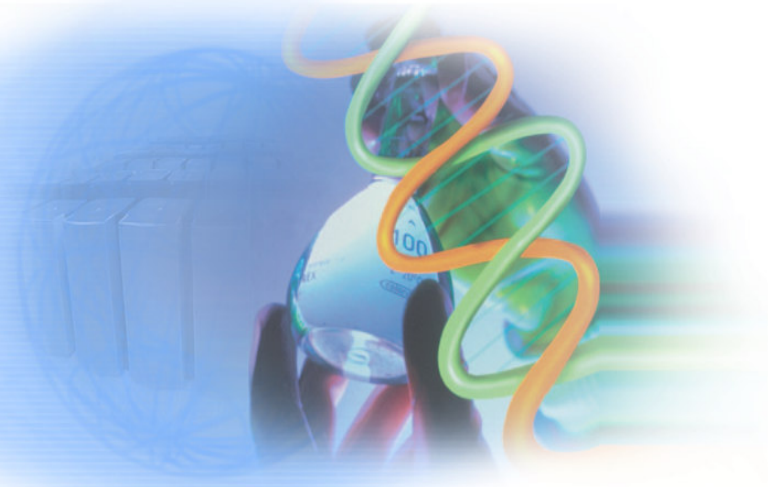
IBM Healthcare & Life Sciences

IBM Life Sciences
Innovation that Matters

SCORE Event
IBM Forum, Madrid
22 March, 2007



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