



IBM Pandemic Preparedness & Response



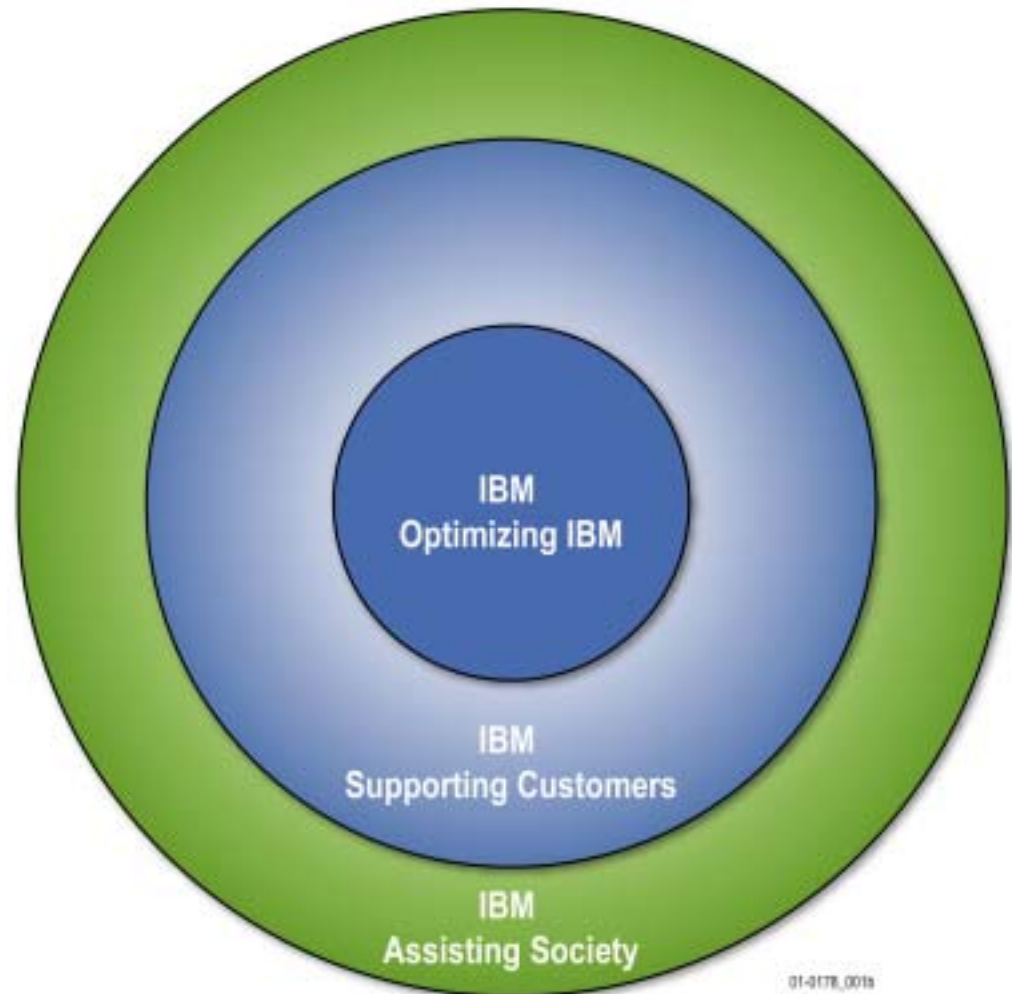
Farhana Nakhooda
AP Healthcare & Life Sciences Solutions Manager

Outline

- Preparedness for IBM employees
- IBM research on pandemic preparedness
- IBM's vision & solutions for pandemic preparedness & response

Preparedness for IBM and its Customers

To optimize IBM's ability to respond to pandemic threats in a manner that provides for the well-being of our employees in their work environments, ensures continuity of operations, minimizes impact on clients and serves as the model of preparedness and resiliency for all enterprises.



01-0178_0019

IBM Global Healthcare



IBM's Subcommittees



90 Day Plan

Optimize IBM's short term response



Global Well-Being Services/ Human Resources

Recommend coordinated preparedness and response plan



Communications

Ensure effective communications outreach



Government Relations

Ensure continuity and alignment with government response



Modeling

Produce models and simulations



Technology

Recommend solutions that enable safety and business continuity



Enterprise Readiness

Develop enterprise preparedness capability

Pandemic response plan that provides for employee well-being and helps ensure continuity of operations

IBM Global Healthcare



Synthesis and Methodology Development

- Leveraged strengths of existing methods
 - General structure and steps
 - Threat phases
 - Business focus

- Added missing human resource elements

- Accommodated IBM's scope, structure and operating model

- Socialized broadly, incorporating feedback, over past 90 days; currently in v9
 - Detailed questions
 - Data collection templates



Readiness Plan Development Methodology

1. Priority Framework

Given the pandemic context, what is most important to IBM from the perspective of your Business Unit? On what basis will criticality be determined?

2. Analysis

Using the Priority Framework, what are the highest priority, most critical processes, customers (specific services). For these critical capabilities, what are the human resource and other requirements, dependencies, and single points of failure?

3. Impact Assessment

How well will we be able to execute the identified critical processes and provide critical customer services, without additional mitigation (e.g. if an event occurred today) given defined planning assumptions? Results will indicate need for mitigation.

4. Mitigation Planning

What are the possible actions that could be taken both in advance of a Pandemic that could reduce the projected impacts?

Based on the costs of the possible actions relative to their potential value (business case), which options will we decide to implement and when?

What is the plan to implement the selected preparedness options?

5. Response Planning

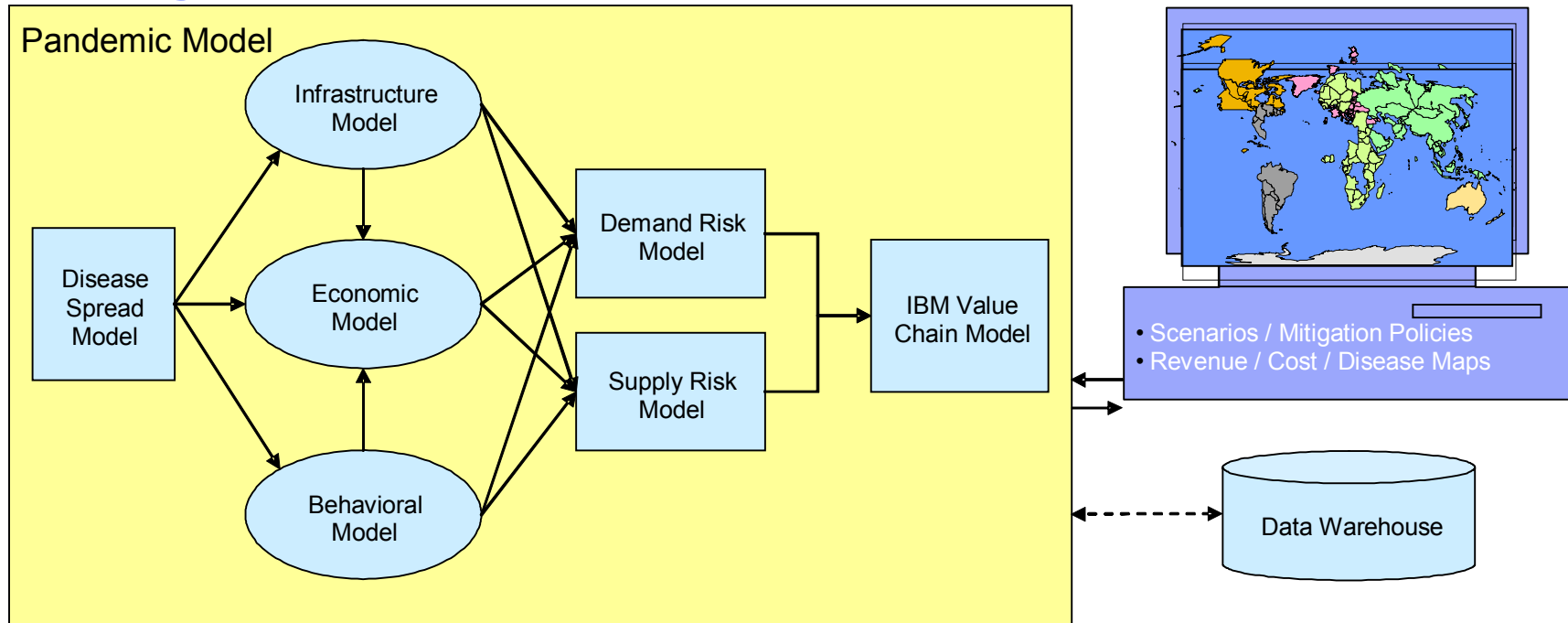
What are the predefined "triggers," how are they called and communicated, what do we plan to do in response and how do we operate during the crisis?

6. Recovery Planning (return to normal operation)

After the pandemic, how do we restore operations to a full, normal status



Modeling Solution Framework



Goal: Quantify the impact to IBM of a potential pandemic outbreak and associated mitigation actions. This includes –

- Impact on revenue
- Change in costs
- Change in demand for IBM products and services
- Workforce availability and health status

Approach: Quantify the impact to IBM of a potential pandemic outbreak and associated mitigation actions. This includes –

- Leverage existing IBM assets such as STEM (Spatio- Temporal Epidemiological Model), SCE (Supply Capability Engine) and Engine) and (developed for Citigroup)
- Develop a demonstration capability by mid-May
- Develop a demonstration capability by early-July
- Assist in developing Preparedness Plan recommendations
- Develop a go-to-market version of the tool to use with external customers

IBM Global Healthcare



Pain Points and Challenges

PREPARE

- No Vaccine Available
- Limited supply of anti-virals
- Limited lab capacity
- Need for stockpiling supplies, meds
- Lack of preparedness plans
- Need for tabletop exercises, training, and drills
- Need for educating society on risks
- Need for clear, concise communication plans indicating actions to take at work and in the community

DETECT

- Expand surveillance in birds and livestock
- Lack real time clinical data surveillance
- Need for enabling field teams with electronic data collection
- Need for Geospatial mapping and sophisticated situational awareness tools
- Need for tracking, tracing, and screening food, animals, people, and products crossing borders

RESPOND

- Communication and collaboration across agencies, districts, states, borders
- Networks, communications up and running 24 x 7
- Locating expertise
- Teaming with people never worked with or don't know
- Partnerships to coordinate containment
- Social distancing with minimal chaos and disruption
- Enabling decision makers, public safety, clinicians, vets with right information at right time to make informed decisions
- Locating and communicating with employees

RECOVER

- Review social, political, environmental, economic re-development
- Replenish supplies
- Systems and processes to encouraging normality
- Financial restitution process
- Evaluate response process

Initial assessment of our current offerings and solutions that can be leveraged for Pandemic Preparedness and Response



	Solutions/Offering	IBM Org	Solution Readiness
Prepare	Pandemic Preparedness and Continuity Assessment	GTS	
	Incident Command Center Review and Construction	GTS	
	Recovery Strategy Definition	GTS	
	Resilient Business and Infrastructure Analysis	GTS	
	Business Process Analysis	GBS	
	Resilient Business and Infrastructure Analysis	GTS	
	High Availability Assessment	GTS	
	Recovery Assessment	GTS	
	Performance and Testing Analysis	GTS	
	Business Impact Analysis	GTS	
	Recovery Options for Multi-vendor and IBM Technology, Networks, and Workplace Environments	GTS	
	Architecture Assistance	GTS	
	Design Reviews for Availability, Recoverability, Scalability / Performance, Quality / Testing, Manageability	GTS	
	Crisis Management Services	GTS	
	Total Continuity Program Management	GTS	
	Recovery Testing	GTS	
	Validation Testing	GTS	
	Managed Security Services	GTS	
	Resilience Program Management	GTS	
SpatioTemporal Epidemiological Modeler	RSCH		

Initial assessment of our current offerings and solutions that can be leveraged for Pandemic Preparedness and Response



	Solutions/Offering	IBM Org	Solution Readiness
Detect	WebSphere Business Intelligence Healthcare Collaborative Network	GBS / SWG	●
	EpiSPIRE	RSCH	◐
	Traceability	GBS / SWG	●
	WebFountain	RSCH	◐
	IHL (infrastructure)	RSCH	◐
Respond	Time of Disaster Services	GTS	●
	Emergency Equipment Acquisition	GTS	●
	Help Desk / Call Center Recovery	GTS	●
	Risk and Continuity of Operations	GTS	●
	Availability Manager	GTS	●
	Resource Tracking	GTS	●
	Secure Wireless Infrastructure Solution	GTS	●
	Rapid Response	SWG	●
	First Responder Interoperability Solution	GTS	●
	Traceability	GBS / SWG	●
	SpatioTemporal Epidemiological Modeler	RSCH	◐
Recover	Post Disaster Recovery Services	GTS	●
	Rapid Recovery Solution	GTS	●
	Hotsite Recovery	GTS	●
	Help Desk / Call Center Recovery	GTS	●

Outline

- IBM's own preparedness for it's employees
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IBM Research Worldwide



IBM's Spatial Temporal Epidemiological Modeler (STEM): A framework and platform for modeling, recognition, and forecast

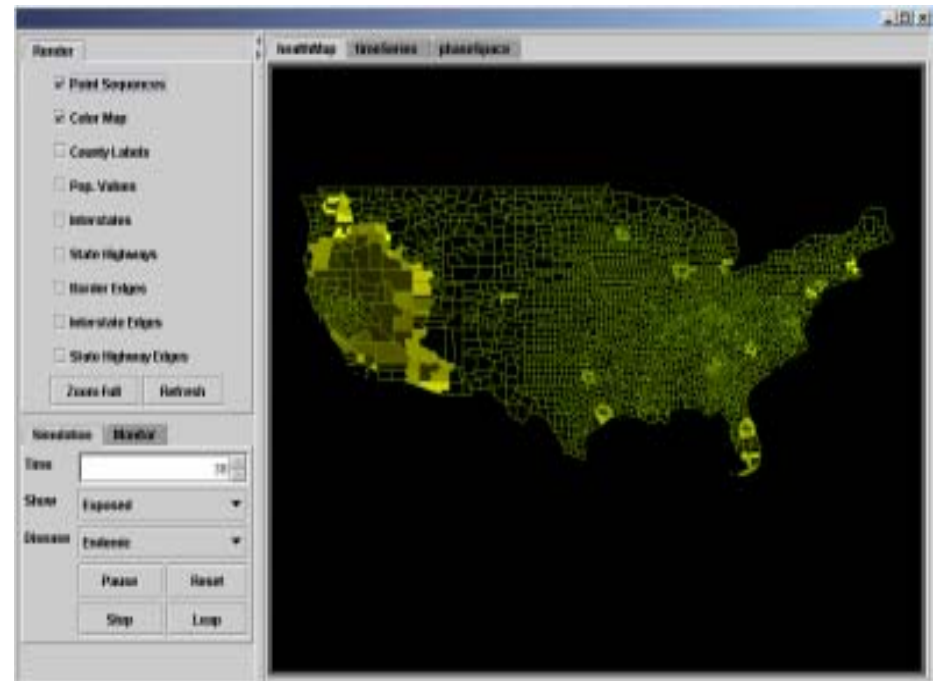
- Modeling framework and tool - for prediction, forecast and planning purposes
- Prototype available for free evaluation (*April 25, 2005*) www.alphaworks.ibm.com
- STEM system is “aware” of spatial relationships in the world
- Pluggable object model allows researchers to easily implement *any* model
- Comes with several spatial models implemented

• Example of a service for Public Health officials

• With GIS data becoming more and more available, STEM can be used for research purposes today.

• Reveal and compare the unique patterns of known epidemics

• Eventually Epidemiological tools like this will facilitate discovery, forecast, and planning based on real time data



STEM is a framework which makes it easier for organizations to develop and test epidemiological models

Current Users of STEM

- First Customers:
 - WHO Regional and National healthcare laboratories
 - Governments in Canada, France
- Supported by the Nuclear Threat Initiative (NTI) - focused on the BRIDGES project - *Building Regional Infectious Disease systems for Global Epidemiologic Surveillance* - between Israel, Jordan, Palestinian Authority, and Egypt
- Justin Lessler, John's Hopkins
 - Professor Donald Burke, UPMC

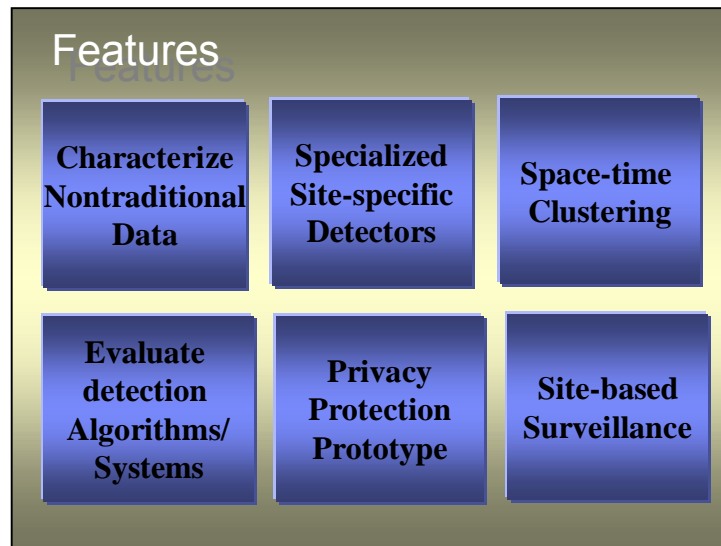
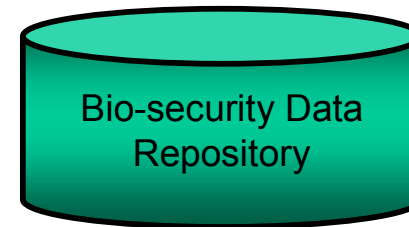
And many more...



IBM's Epi-Spire provides a broad base environmental monitoring and surveillance system for early detection of public health/ public safety events such as a bio-terrorist attack.



Epi-Spire



Benefits

- High-resolution real-time environmental data made available for baseline modeling
- Extends spatial scan statistic to flexible cluster shapes (e.g., square pyramid)
- Randomized search algorithm to explore huge space of candidate solutions
- Application to real data shows a cluster with significantly different characteristics compared to earlier analyses

- Earlier work modeled environmental factors in vector-borne disease (e.g., Hantavirus, West Nile)
- Joint work with Greg Glass, JHU School of Public Health



Project Checkmate

- This collaborative effort brings together IBM and The Scripps Research Institute — a leading research institute in life sciences — to conduct advanced research on pandemic viruses. The objective? To anticipate, manage and contain infectious diseases.
- Project Checkmate will investigate the emergence of new virus strains and the corresponding immune system response in humans and animals.
- This new information will help the researchers to better understand and proactively anticipate the behavior of these complex viruses, as well as an immunological means to contain them.

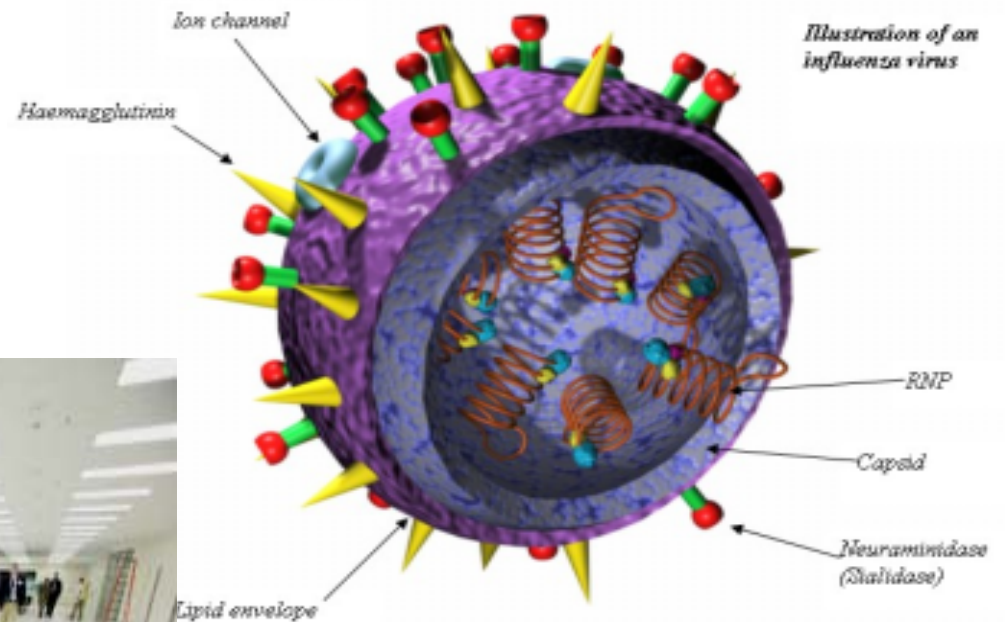


“The anticipation and containment strategy of this project will require development of new algorithms to take advantage of Blue Gene scale supercomputing. Also, the biopatterning and microfluidics technologies out of Zurich Research Lab will play a big role in enabling high throughput screening and detection of antigen-antibody complexes.”



Project Checkmate – IBM and Scripps Florida

The objective of “Project Checkmate” is to develop means to anticipate, manage and contain infectious diseases such as Avian Influenza by understanding and defending against the biological agent.



Blue Gene/L at LLNL – 280.6TFlops

The computational effort in Checkmate will require advanced high performance computing capabilities delivered by IBM Blue Gene technology.



The Global Pandemic Initiative is ...

- A coordinated, open, collaborative initiative designed to improve pandemic preparedness and response around the world.
- Leveraging unique IBM assets and technologies
 - IBM Research
 - GPI Advisory Board
 - World Community Grid
 - Blue Gene
 - STEM
 - IHII
- With our partners
- To build a global public health ecosystem

"The threat of a pandemic is a definitively global phenomenon," said Sam Palmisano. "Our response must be similarly global, and must rely — as with so many other major issues we face today — on open, collaborative innovation. IBM is proud to join with our partners in this effort, grounded in our core value of 'innovation that matters.'"



Global Pandemic Initiative – some focus areas

- Augment existing infrastructure to underdevelopment markets, specifically: Indonesia, Bangladesh, India, Viet Nam, Laos, Cambodia, China
- 2. High quality disease surveillance systems that connect to lab systems for confirming AI
 - phones, portal, automated systems for sending information
 - will require standards for what information is needed
- 3. Common standards for disease reporting
- 4. Improve communications and data sharing by overcoming language barriers and translation issues – need to consider cultural differences
- 5. Method for collecting reference data and store at central location for research as well as response during pandemic
 - ex. populations of animals, migratory paths, locations of available resources such as respirators, ventilators
- 6. Participate in Asia Disease Surveillance Project that NTI is leading
- 7. Open Source meeting with WHO researchers to discuss open source disease surveillance systems



IBM's Global Pandemic Initiative

The Steering Committee - Meeting in Hawthorne November 2005

- Ann Marie Kimball, MD, MPH, FACPM – APEC, University of Washington
- Barbara Addy - US Agency for International Development
- Bee Hoon Heng - Singapore Ministry of Health
- Charles Riemenschneider PhD – FAO North America
- Dale Nordenberg - Centers for Disease Control and Prevention
- Dan O'Brien - US Agency for International Development
- Diego Buriot – World Health Organization
- Donald S. Burke - The Johns Hopkins Bloomberg School of Public Health
- Gonghuan Yang, PhD – China CDC
- Jeff Aramini, PhD – Health Canada
- Joxel Garcia, MD, MBA - Pan American Health Organization
- Kazuo Suzuki, Ph.D -, National Institute of Infectious Diseases, National Institute of Health, Tokyo
- Kee Tai Goh, MBBS, MSc, MD, FAMS - The National University of Singapore, Singapore Ministry of Health, WHO Collaborating Centre for Environmental Epidemiology
- Lawrence Madoff, MD - PROMED; Harvard University; Brigham and Women's Hospital
- Lindiwe Makubalo, MD – South Africa Department of Health
- Mark Smolinski, MD, MPH - Nuclear Threat Initiative (NTI);
- Richard Waldhorn, MD - University of Pittsburgh Medical Center - Center for Biosecurity
- Richard A Lerner, MD – the Scripps Research Institute
- Steve Solomon, MD – US Centers for Disease Control and Prevention
- Tim Brewer, MD, MPH - International Society of Infectious Diseases
- Toby Levey - The Global Medical Forum



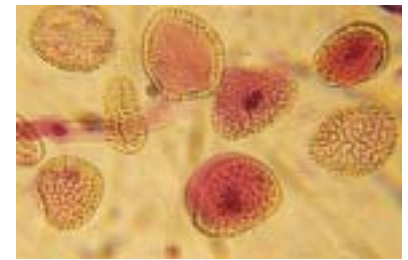
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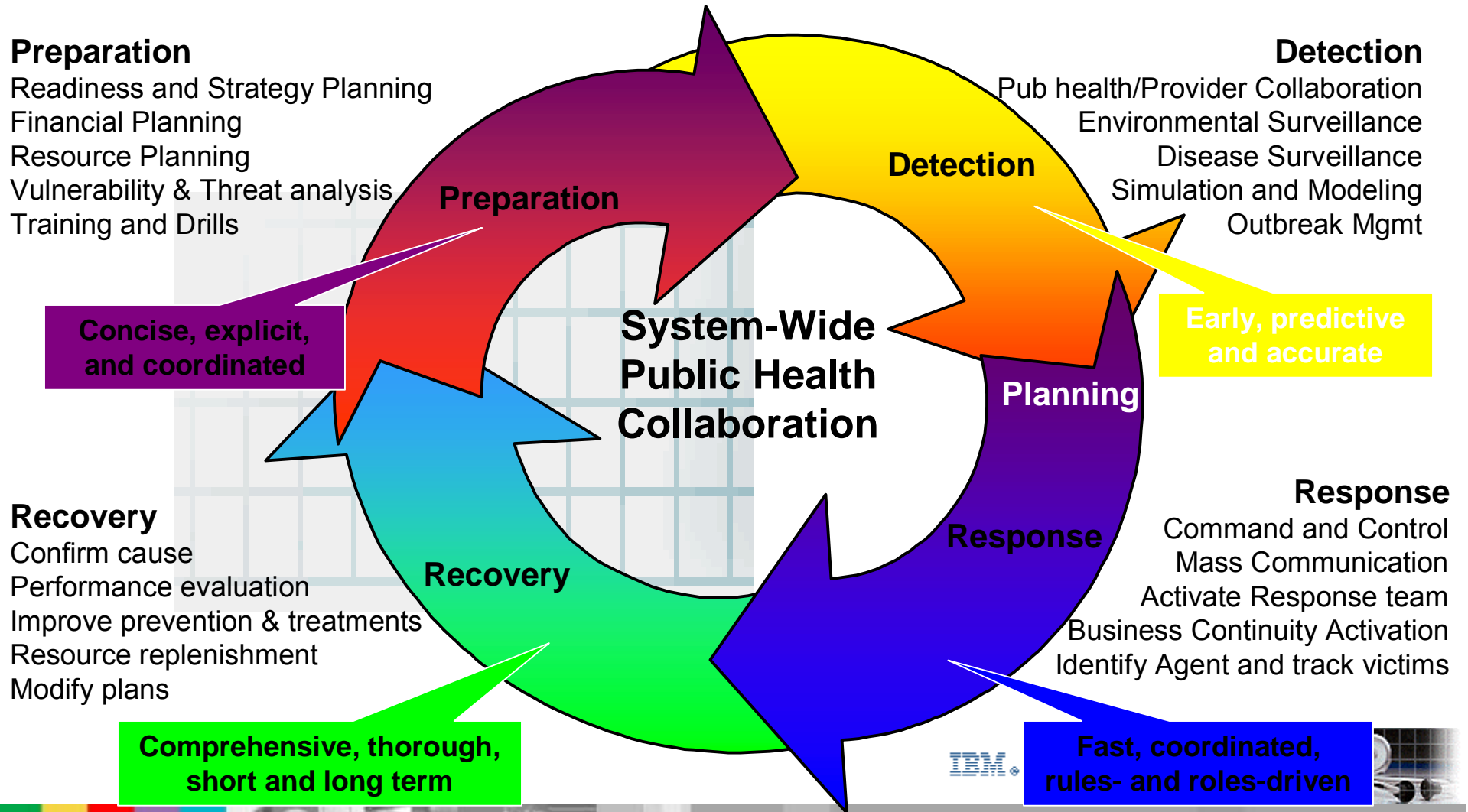
IBM's Vision for Disease Surveillance and Strategic Incident Management

- *IBM will help communities preserve economic viability and social vitality through solutions, technologies, and services that enable the public health and healthcare ecosystem carry out everyday business needs and scale to better prepare, detect, respond, and recover from incidents caused by natural disasters or intentional forces.*

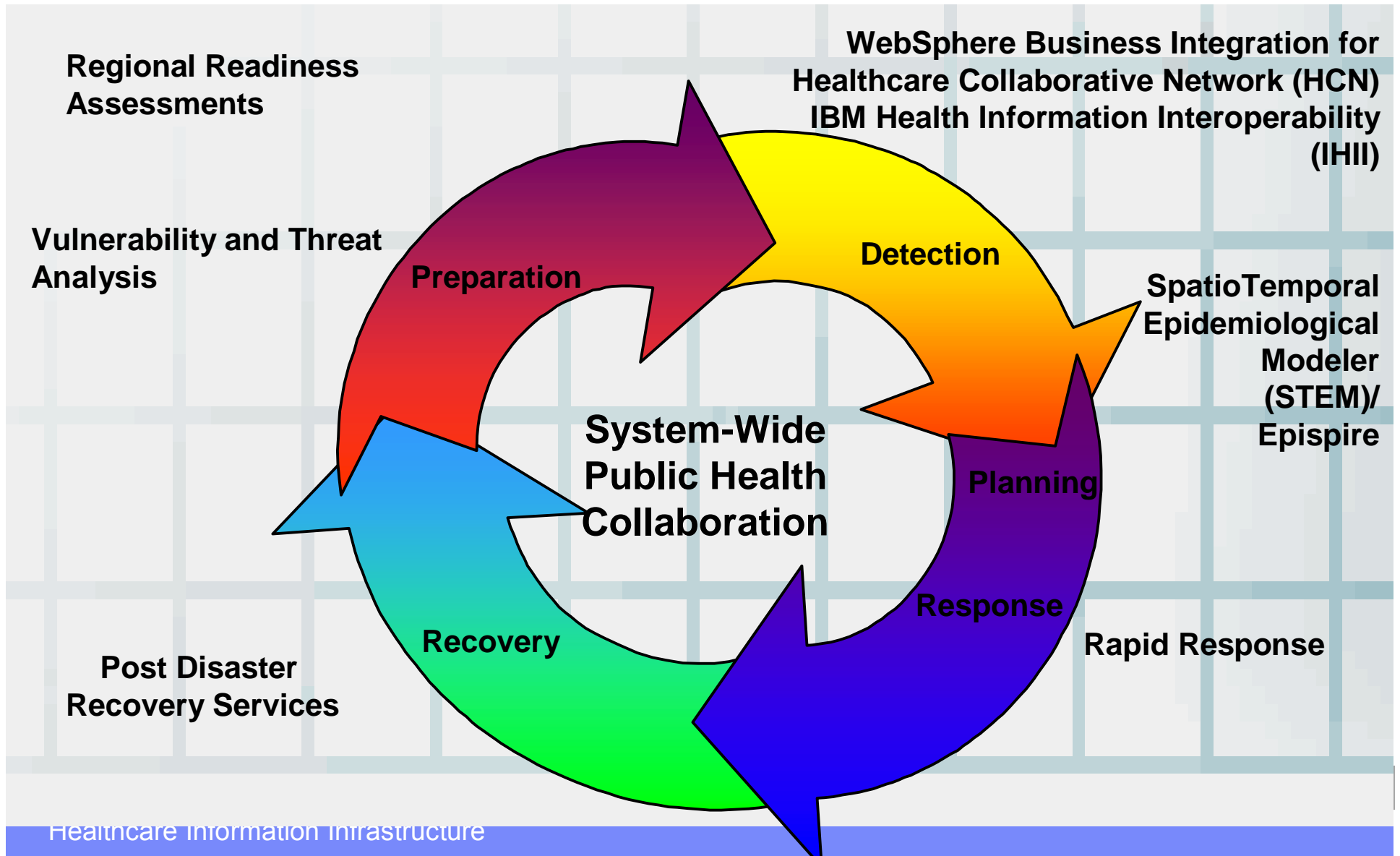
- *Our solutions, technologies, and services:*
 - *Enable interoperability within and among enterprise applications, databases, and systems*
 - *Facilitate inter/intra agency communication and collaboration*
 - *Provide standards-based, open infrastructure enabling sharing of data, while protecting privacy through a robust security architecture*
 - *Flexible architecture for the addition of new services as required*



The Public Health Management Life Cycle must be executed collaboratively across the ecosystem

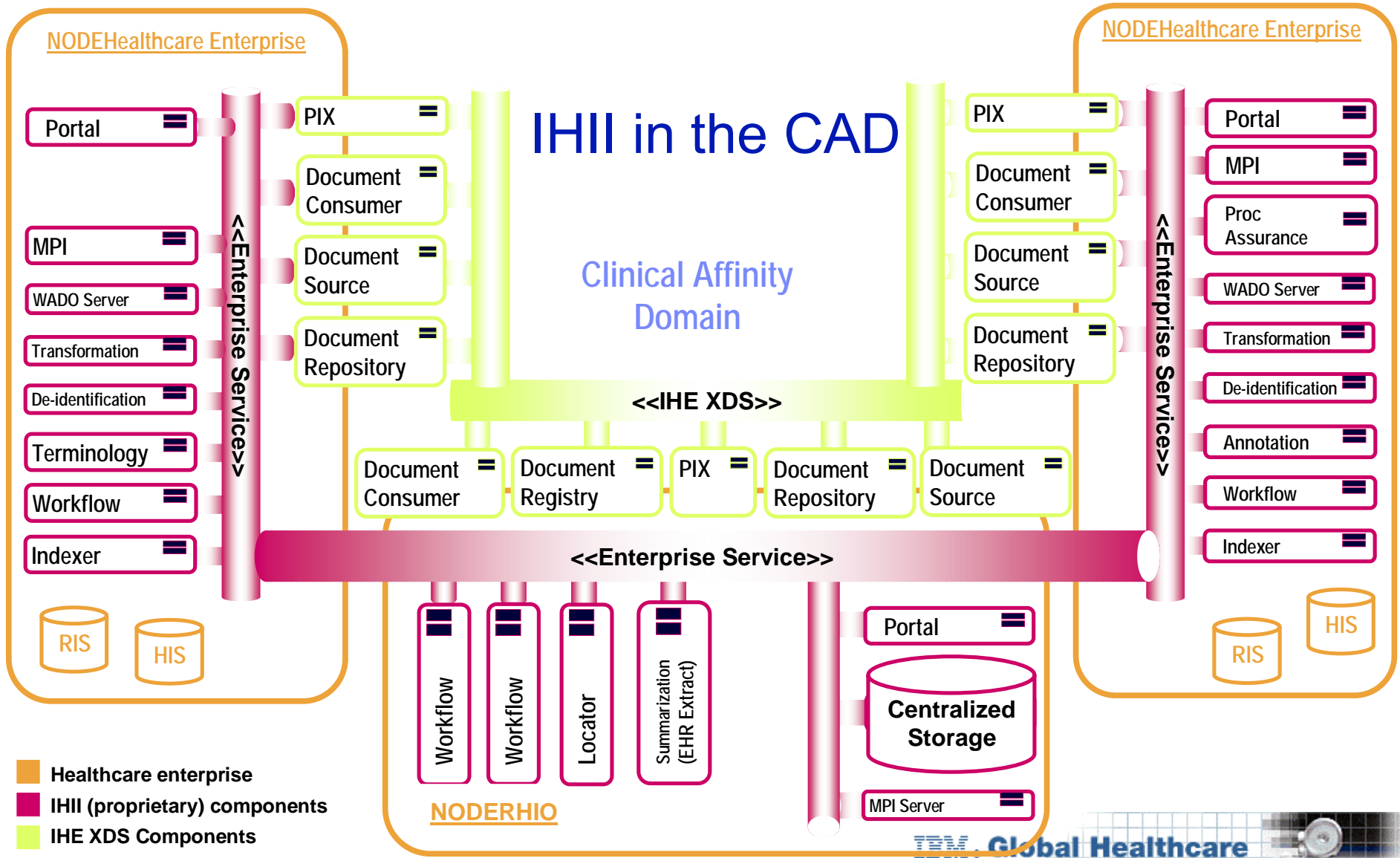


IBM has solutions, technologies, and services for every phase in the Public Health Management Life Cycle

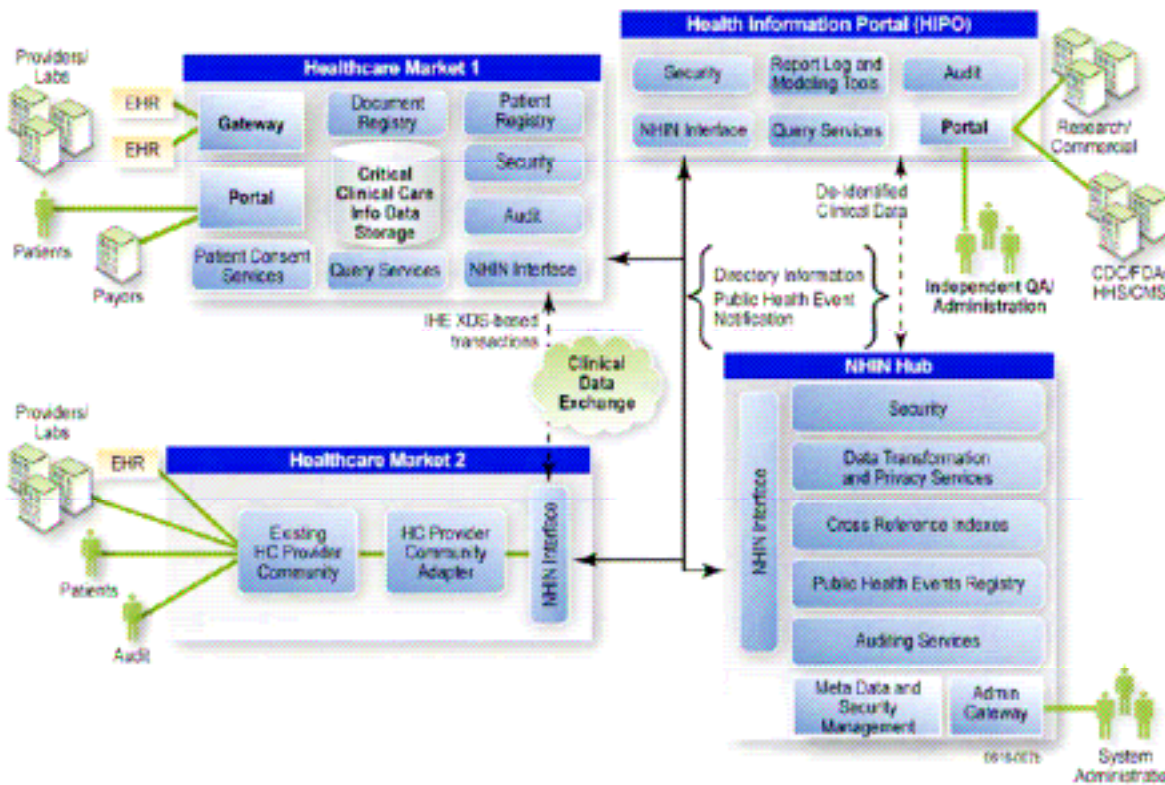


IBM Interoperable Health Information Infrastructure (iHII) - - An IBM system designed to allow the first on demand ecosystem in the health care industry

- iHII is designed to aid communication and collaboration among medical facilities in collecting and sharing health data.
- iHII will be used in collaboration with players in the health care field to accelerate the development of a true standards-based, interoperable national health care information system, enabling the integration of clinical information among hospitals, agencies and consumers to improve the effectiveness of medical care
- IHII was the basis for the United States ONCHIT IBM Contract in Response to Brailer's RFP and several major projects including Wellpoint, CDC China, Canada, etc
- Scientific Links...
 - Patents, Publications (AHIMA, Onchit), Collaboration with John's Hopkins
 - IBM is now a major contributory to the Eclipse Open Health Framework
- First Ever IBM participation at the IHE Connectathon and HIMSS.
 - Helped over 28 ISVs interconnect



The prototype will include varied technical approach e.g., federated versus centralized



Other Contracts recently awarded by the Office of the National Coordinator for Health Information Technology

- Standards Harmonization - ANSI
- HIT Certification – CCHIT (Certification Commission for HC Information)
- Security and Privacy Harmonization – RTI (Research Triangle Institute)

Contract background

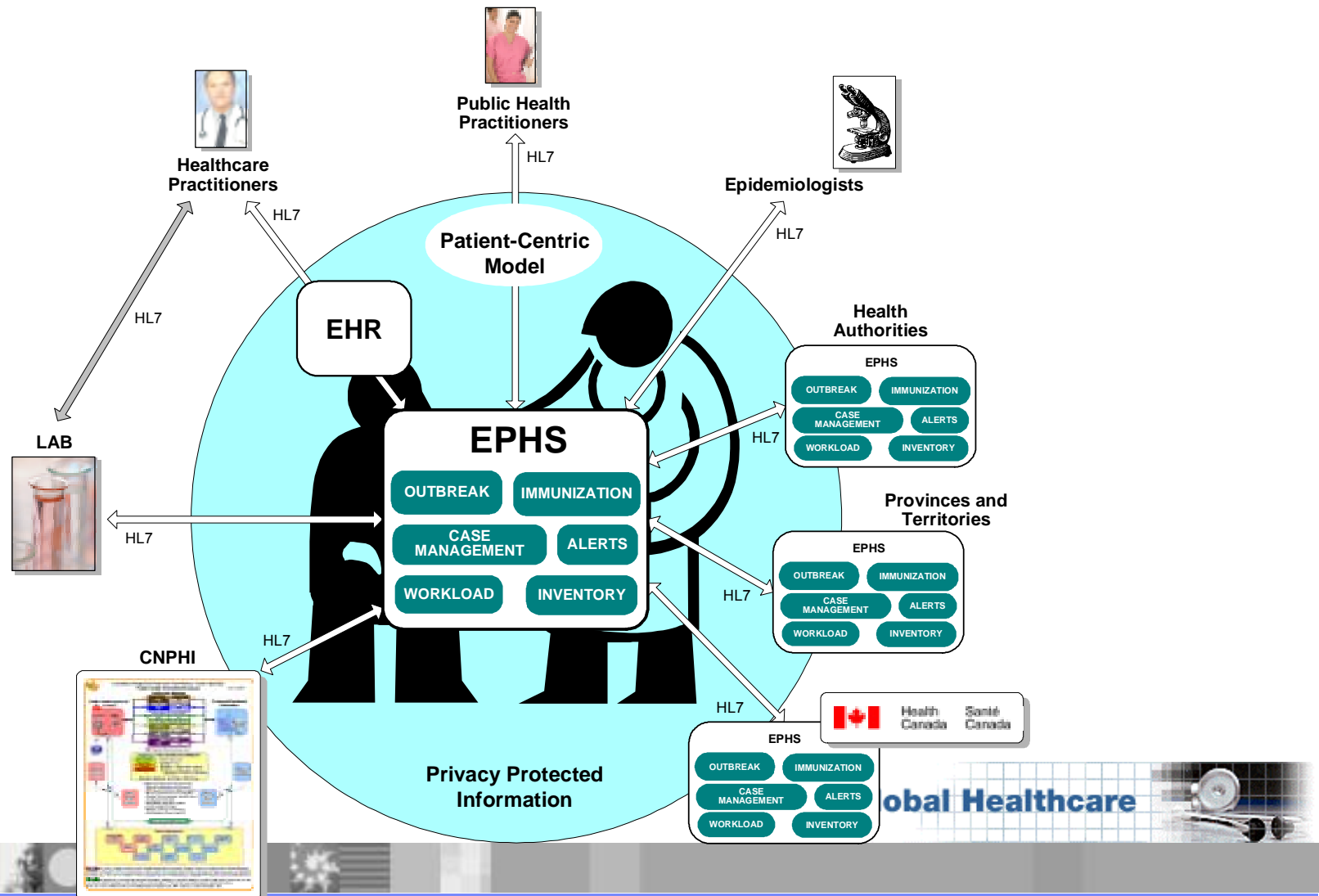
- Duration 1 year with possible extensions
- Gov't defined use cases

Prototype Objectives

- Start-up money to seed the market
- Establish up to 4 “utilities” that can contract with communities for future support
- Create market momentum
- Pressure/incent the consortias to invest in building a full fledged, community-based healthcare information exchange
- Accelerate Electronic Health Record (EHR) adoption



Pan Canadian Vision - The IBM/STC Solution for Canada provides all the required functionality, supports the Public Health Professional and can be implemented in each jurisdiction integrating with the EHR infrastructure.



IBM IT Strategy & Planning Project with CDC China - Beijing

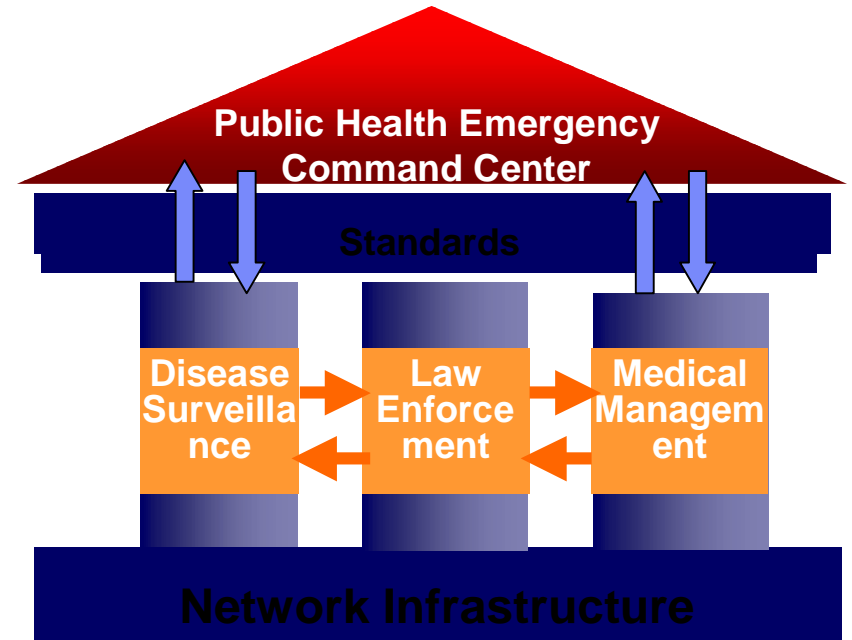
Objectives:

- Integrate 20-30 different disease surveillance systems
- Integrate data from 200-300 different disease surveillance sites
- Collecting data on 37 different types of infectious diseases



The whole project has four phases focusing on CDC Phase II implementation project (integration platform, immunization and public health laboratory system)

- Phase 1: CDC Business and Requirement Analysis
- Phase 2: Conceptual Model Design
- Phase 3: Functional Model Design
- Phase 4: Implementation Plan



IBM Global Healthcare

Total timeframe: 19 Weeks

Mid East Consortium on Infectious Disease Surveillance

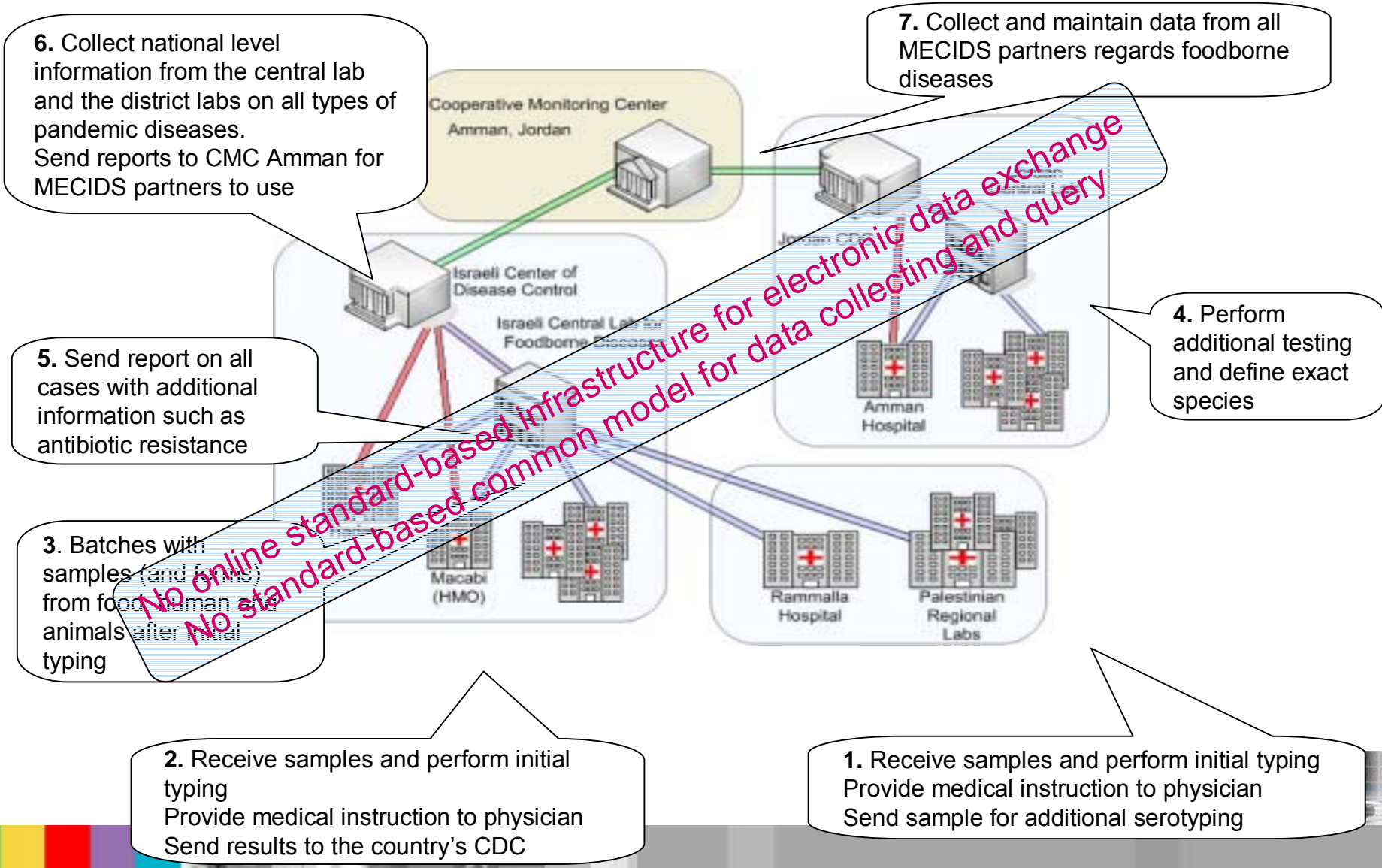
- Composed from:
 - MoHs of Jordan, Israel and the Palestinian Authority
 - Variety of regional and national healthcare laboratories
 - Israeli and Jordanian CDCs and Cooperative Monitoring Center (CMC) Amman Jordan

- IBM will provide
 - On-line real-time and standard-based infrastructure for exchange of public health data and information
 - Set of modeling and analysis tools for infectious disease surveillance
 - Based on the STEM toolkit

- IBM will gain
 - Hands-on experience with multi-national public health organizations
 - Standard based solution that can be deployed elsewhere



Mid East Consortium on Infectious Disease Surveillance



The IBM Crisis Response Team

On-site emergency management: 70+ global events, 49 countries

General Responsibilities: International humanitarian relief; corporate risk and insurance management; government and private sector services

Hurricane Katrina and Rita Immediate Response :

- \$3.2M*: Corporate donation of technology and technical services
- Priority 1: Health and safety of those unable to evacuate and who are being sheltered in neighboring parishes and states
- Priority 2: Long-term recovery of the region and the thousands of displaced people in communities throughout the South

Comprehensive assessment and ongoing technical assistance:

- Local, state and federal officials
- FEMA
- Emergency response teams
- All critical local relief organizations
- Universities, colleges
- Medical institutions



Emergency Management System Components

EMRS – Emergency Management and Response System

- Incident Reporting / Management
- Contact and Personnel Management
- Equipment Resource Management
- Tasking & Assignments
- Facilities Tracking & Storage
- Routing & Road Condition Status
- Donation Management
- Volunteer Coordination
- Incident Planning & Analysis
- Financial Tracking
- Decision Support – Field Customization



CONTACTS	Name	Company	Title	Phone	Email	Address
NEW CONTACT	Anderson, David	Fire Service	Fireman	888-6580	danderson@red.com	5248 St Homerille LA
By State	Down, Joseph	Fire Service	Fire Chief	888-5656 x123 888-7078 888-7088	jdown@red.com	536 South Street Homerille LA 70021
By State	Jones, John	LAH	Quartermaster	888-6676	aj@red.com	45 S. Main St #20 Homerille GA
By State	Loose, Jennifer	Ambulance Service	Dispatcher	888-2626		278 Hill St Homerille LA
By State	Smith, Paul	Ambulance Service	Paramedic	888-6578	paul.smith@red.com	888 South Way Tomberville LA

1. Field user reports incidents on an ongoing basis (example)



Emergency Intervention and Response System

SAMPLE ONLY

Incident Management
My Learning
My Page

Welcome Tony Walker - District Manager!! Facility - Memphis, TN Area - South East 12 April, 2002

My Incidents [Add New Incident] - [Refresh] [Close]

Inc #	Description	Date	Status
1	Asbestos Level on Floor-1 exceeds .0001 ppm	04/03/02	Active
2	Variation in SPA-Fluid viscosity noted on DBCS	03/31/02	Active
3	Employee - Sara Hughes suffered from possible food poisoning	03/29/02	Active

more ...

My Employees Status - [Refresh] [Close]

Employee Name	Location	Status
Jill Ruth	Memphis P&DC	OK
Rebecca Ingram	Memphis P&DC	OK
Pete Thapper	Memphis P&DC	Hospitalised
Jesse Thompson	Memphis P&DC	OK

more ...

Emergency Contacts [Add New Contact] - [Refresh] [Close]

Name	Organization/Title	Phone
Capt. Neil Keller	Fire and Ambulance	809-992-7899
Sergey Koliday	USPS - Water Plant Manager	809-445-9122
Joe Yulnu	FEMA - Contamination Expert	809-222-0291

more ...

My USPS Email - [Refresh] [Close]

New: [CONTACT](#) [EMAIL](#) [APPOINTMENT](#)

From	Subject
Tim Lake	http://homer.rte.microsoft.com/
Ben Geislinger	dll
Meredith Crynes	weekly updates
tosubscribe@sfna.com	Newspaper Subscription
Dan DeMichele	New Install Guide

My Alerts

#	Alert Message	Priority
1	Status for incident #1 has not been updated for the last 72 hours	High
2	Incident "Variation in SPA-Fluid viscosity noted on DBCS" needs to be reported to HQ	Medium
3	Your emergency contacts list needs to be updated	Low
4	Solid and Hazardous Waste Handbook now available on www.postal.ppc.com	Low
5	Please enroll for the "Emergency & Disaster Planning" course	Low

more ...

HQ Communications - [Refresh] [Close]

[Award to ERS Personnel](#) - Washington DC, Mar 14 2002 - The EIRS group awarded Jack Walter with a \$20,000 gift cheque for his outstanding ...

[Postmaster General Jack Potter announces Emergency Preparedness Plan](#) - Washington DC, March 10 2002 - Jack Potter today unveiled a \$10 billion Emergency Prepa ...

[EPA set to Publish Amended Final Rule](#)

more ...

My Facility Documents - [Refresh] [Close]

- My Emergency Documents
 - COOPS
 - Evacuation Procedures
 - Floor Plans
 - Situation Specific documents
 - Anthrax
 - Fire
 - Flood
 - Hazardous Spills

Name	Size
First Floor Evacuation Plans - A	1 KB
List of DBCS - By Profile	1 KB
Second Floor Evacuation Plan - A	1 KB

Search by Keyword ===>

Subject Matter Expert Locator - [Refresh] [Close]

Healthcare Information Infrastructure

2. HQ users monitor nationwide incidents as reported by the field...



Emergency Intervention and Response System

SAMPLE ONLY

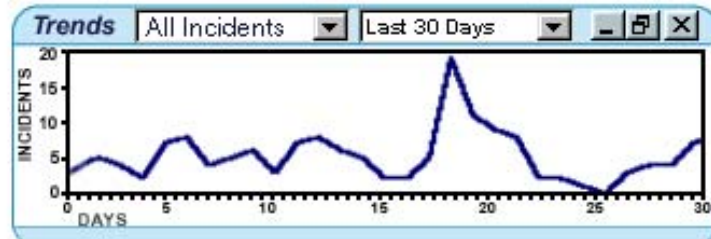
Dashboard

Incident Management

Applications

My Page

Welcome Kaiser Soze - Operations Manager !! Location: HQ - 12-Apr-02



My Alerts

#	Alert Message	Priority
1	Aceto-propylene spill in Memphis, TN facility at 10:25 AM	High
2	Albany, NY facility closed due to blizzard	Medium
3	Increase in Nitrogen Oxide emission observed at Orlando, FL. EPA involvement required.	Medium
4	Modifications to standards and requirements for reformulated and conventional gasoline document available.	Low

Incident summary by Area

Incident Type	NY Metro	N.E	S.E	N.W	...	Total
Fire	1	2	1	0	...	12
Chemical Spill	0	2	1	2	...	3
Medical Illness	1	0	0	0	...	2
Flood	1	1	0	0	...	4
Total	3	5	2	2	...	21

Today's Incidents (12-Apr-02)

Inc #	Date	Description	Status
1	4/12/02	Asbestos Level on Floor-1 exceeds 0.001ppm	Active
2	4/12/02	Anthrax spores found at the Kilbrun, CA facility	Active
3	4/12/02	Benzene Peroxide container spilled in Barney, PA facility.	Active

News

236 pounds of stolen mail recovered
 Lay-off deal eases fear of post strike
 USPS launches Post-It Note Test Program

[more ...](#)

Meeting the Challenge of Sept. 11, 2001

IBM Rapid Response Solutions

- **Communications**
 - **Wireless Blackberry Network**
 - - “Sametime” instant messaging
 - - Mayor, Governor, Responders, NGO’s
- **Weather Forecast System**
 - **Weather analysis within 1 kilometer zone**
- **Equipment Acquisition**
 - **Provided emergency equipment to help**
 - **Restore IT systems and communications.**
- **Family Assistance & Fatality Tracking**
 - **Customized Applications**

Building Status Management

Linked data from multiple NYC agencies
Timely status on ALL impacted facilities

GIS Interface

Linked Maps to Building Status

Logistics Management

Receipt, storage, disbursement, tracking

• **Improvise, Implement, Refine**





Thank you

