Conducting an "Alternatives Analysis" of Integrated IT Solutions for the National Public Health Surveillance and Biosurveillance (NPHSB) Registry for Human Health

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Background

What is the NPHSB Registry?

- **The NPHSB Registry is a comprehensive electronic catalog of CDC's surveillance activities.**
  - Holds only information **about** existing surveillance activities.
  - **Does not** contain any surveillance data.

Why was the NPHSB Registry Created?

- Provides a first step in moving CDC toward a nationwide approach to integrating biosurveillance and enhancing the United States' ability to detect and respond to health threats.
- Fills the existing void for a current, accurate and accessible repository of information on human health biosurveillance activities.
- Provides CDC experts access to critical information about CDC's surveillance activities that may help foster collaborations among surveillance Subject Matter Experts (SMEs).

Problem Statement

- Selection of the initial technical solution to support the NPHSB Registry was not based on a thorough alternatives analysis.
- Development of the NPHSB Registry took place instead using technology that was readily available due to time and resource constraints.
- This resulted in:
  - Limited flexibility in customizing the data collection, data analysis and reporting components to meet program needs.
  - Numerous challenges in seamlessly integrating components across the data life cycle.
  - Difficulty in generating reports impacting value added opportunities.

Technical Challenges

Data Collection	• Usability: Not easy to update feel, design, and display of survey • Functionality: Does not provide complete skip logic functionality • Flexibility: Not easy to make changes to survey data • Updating: Difficult to update the data for making changes
Data Storage / Analysis / Transformation	• Accessibility: Limited access to production database containing the survey. Cannot transform, manipulate data before exporting • Duplicated effort in maintaining the data (multiple databases) • Challenges in retrieving data for analysis and reporting • Data output limitations: Require extensive massaging to get into analysis format • Not stored in a relational database because of the SPSS DB limitations • No seamless transformation of data from collection to analysis to reporting
Data Reporting	• Current database solution does not provide capabilities for custom reporting through a web front • Significant effort and expertise required to produce stakeholder reports

Objective(s)

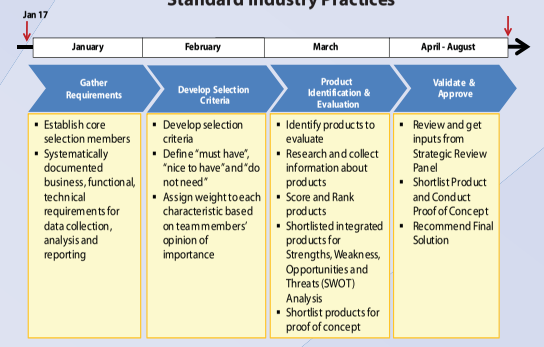
- To conduct a thorough alternatives analysis of products that will support the collection, analysis and reporting of data for the NPHSB Registry.
- To select and implement an integrated solution.

Methods

Our Approach to Address These Challenges

- From January-August, 2011 we are conducting an Alternatives Analysis to evaluate products for potential inclusion in an integrated solution to support data collection, analysis and reporting for the Registry.

Alternatives Analysis Approach Based on Standard Industry Practices



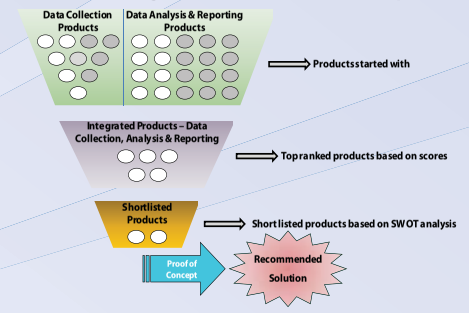
January-May 2011

- Identified 30 potential products that can be used for data collection, analysis and reporting.
- Rank ordered these products based on overall product scores.
- Took the highest ranking 9 products in different combinations and came up wtih 8 potential options for an integrated solution.
- Conducted a Strength, Weakenss, Opportunities and Threats (SWOT) analysis for each of the 8 integrated solutions.
- Based on findings from SWOT analysis, short listed 4 integrated solutions for the "Proof of Concept" phase.

May 2011-August 2011

- Conduct "Proof of Concept" of the 4 integrated solutions and select 1 for final implementation.

Short listing Products for "Proof of Concept"



The following characteristics were used to select the data collection, analysis and reporting components. Each characteristic was assigned a weight based on expert opinion.

Data Collection	Weight	Data Analysis	Weight	Data Reporting	Weight
Usability & 508 Compliant	13	Usability & 508 Compliant	9	Usability & 508 Compliant	13
Publishing, Presentation & Distribution	9	Data Management, Workflow Capability & Agility	12	Publishing, Presentation & Distribution	10
Flexibility, Workflow capability & Agility	10	Data Scrubbing & Quality Management	13	Flexibility, Workflow capability & Agility	10
Integration & Data Format	10	Integration / Compatibility	10	Integration / Compatibility	10
Security	7	Security	7	Security	7
Accessibility/ Hosting & Scalability	10	Accessibility/ Hosting & Scalability	7	Accessibility/ Hosting & Scalability	7
Vendor Support	7	Vendor Support	6	Vendor Support	6
Existing CDC / BC relationships & Track record of usage	7	Existing CDC / BC relationships & Track record of usage	10	Existing CDC / BC relationships & Track record of usage	10
Performance, Reliability and Robustness	7	Performance, Reliability and Robustness	6	Performance, Reliability and Robustness	7
Level of expertize, Additional resources needed, Time to implementation - Ease of Installation	10	Level of expertise, Additional resources needed, Time to implementation - Ease of Installation	10	Level of expertise, Additional resources needed, Time to implementation - Ease of Installation	10
Solution Value vs. Cost	10	Solution Value vs. Cost	10	Solution Value vs. Cost	10
	100		100		100

Product Scoring Formula

Step 1 – Finalize criteria.

Step 2 – Characteristic Weight – Assign weights to the criteria (Registry team assigned a weight to each criteria).

Step 3 – Criteria Importance – Assign importance to established criteria (must have=2, nice to have=1, not needed=0).

Step 4 – Criteria Met – Assess degree to which each product meets each criteria (meets criteria=2, partially meets criteria=1, does not meet criteria=0) – Conducted by Systems Architect based on extensive product research with vendors, demos, literature, SMEs.

Step 5 – Calculate product score.

Step 6 – Rank products based on score.

Product Score = Σ {Characteristic Weight * [(Criteria Importance * Criteria Met) / # of criteria]}

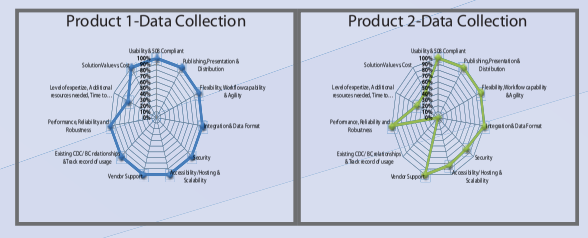
Results

Product Ranking Based on Scores

Rank	Data Collection Product	Score (Max -324)	Rank	Data Analysis & Reporting Product	Score (Max -621)
1	Prod 1-Data Collection	317	1	Prod 1-Analysis & Report	611
2	Prod 2-Data Collection	265	2	Prod 2-Analysis & Report	507
3	Prod 3-Data Collection	242	3	Prod 3-Analysis & Report	490
4	Prod 4-Data Collection	226	4	Prod 4-Analysis & Report	486
5	Prod 5-Data Collection	221	5	Prod 5-Analysis & Report	476
6	Prod 6-Data Collection	216	6	Prod 6-Analysis & Report	450
7	Prod 7-Data Collection	194	7	Prod 7-Analysis & Report	425
8	Prod 8-Data Collection	172	8	Prod 8-Analysis & Report	415
9	Prod 9-Data Collection	171	9	Prod 9-Analysis & Report	413
10	Prod 10-Data Collection	165	10	Prod 10-Analysis & Report	406
			10	Prod 11-Analysis & Report	406
			10	Prod 12-Analysis & Report	406
			10	Prod 13-Analysis & Report	406
			10	Prod 14-Analysis & Report	406
			10	Prod 15-Analysis & Report	406
			16	Prod 16-Analysis & Report	404
			17	Prod 17-Analysis & Report	389
			18	Prod 18-Analysis & Report	386
			19	Prod 19-Analysis & Report	366
			20	Prod 20-Analysis & Report	349

Product Scoring Results (Sample)

Demonstrates how well the products fare against characteristics.



Sample SWOT Analysis: Product 1 Data Collection Analysis & Reporting

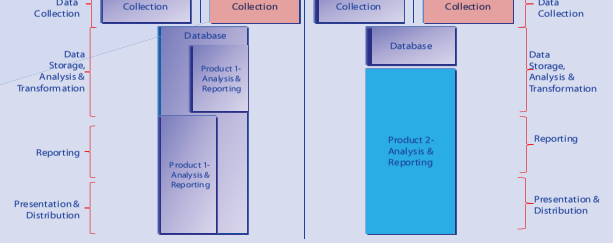
Strengths
- Product 1-Data Collection
  - High usability & flexibility, enterprise license results in very low cost
- Integration between components – Product 1-Data Analysis & Reporting
  - Product 1-Data Analysis & Reporting integrates automatically with SharePoint. SharePoint integrates well with InfoPath.
- Product 1- Data Analysis & Reporting
  - Robust, pre-packaged analytics component
  - Easy to design a customized user interface with Report Server and Report Designer
  - Easy to build custom reports with Report Builder
  - Current CDC infrastructure in place to support all system components
  - Established internal/external vendor support
- Microsoft is marketing this combination as their BI technology solution
- Scalable to accommodate growth

Weaknesses
- A component of Product 1-Data Collection is not approved for external access
- Not an open source platform

Opportunities
- We would be aligned with CDC long term technology preference
- Since ITSO is discussing Cloud Computing and already provides enterprise Services for this product to all the CDC programs, the proposed option is likely to align with CDC cloud computing policies, once they are established
- Dash Boarding and Office Integration are other opportunities which can be leveraged
- Product 1-Data Analysis & Reporting database easily integrates with Other BI tools

Threats
- If CDC changes its technology strategy direction, the solution may not be supported to that extent

4 Shortlisted Product Combinations for "Proof of Concept" Phase



Conclusions

- Conducting an alternatives analysis, while critical, is an often missed step due to time constraints, budget or expertise.
- Conducting an alternatives analysis at project inception can facilitate in the selection of a technical product suite that best meets program/business needs.
- An alternatives analysis ensures that data are better integrated across the collection, analysis and reporting phases, potentially resulting in time/resource savings in the long run.
- The approaches used in this assessment can be applied by other programs to evaluate IT products in support their own informatics needs.
- Sharing this process can prevent "reinventing the wheel" and result in savings as programs collectively innovate and evolve to advance the national public health mission.

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NPHSB Registry

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