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Harnessing **Big Data** in Shipbuilding



What exactly does the term “Big Data” mean, and how does it relate to the Shipbuilding Enterprise?

Gartner Inc.’s definition is often quoted:

“Big data” is high-volume, -velocity and -variety information assets that demand cost-effective, innovative forms of information processing for enhanced insight and decision making.

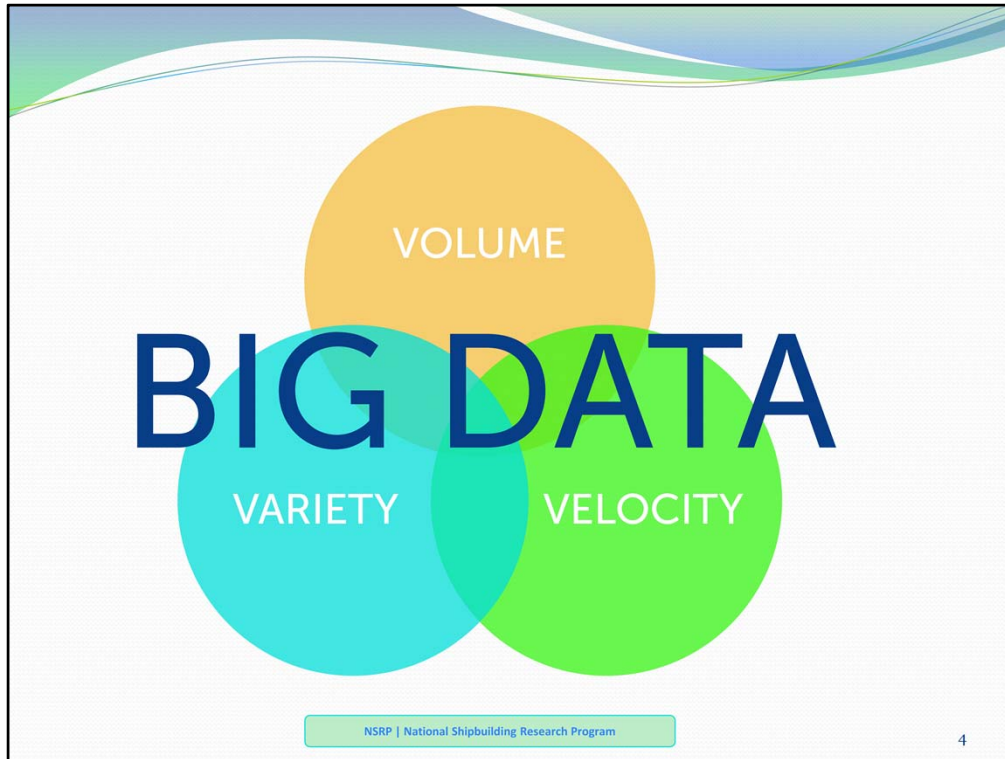


Big Data refers to the **massive amounts of data** collected over time that are **difficult to analyze** and handle using **common database management tools**.

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3

Big Data includes both familiar, business data sets (**spreadsheets/databases**) and sources such as **email, surveillance photos, sensors and social media**



Some key enablers of the genesis and growth of Big Data can be broken down into three components that help people understand what Big Data is – volume, velocity and variety. [[Gartner, Inc.](#)]

VOLUME

“Big” in Big Data

VELOCITY

Challenge lies in the ability for businesses to analyze and derive meaningful information from this steady influx of information

VARIETY

Structured / Unstructured

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5

Volume – essential component of “Big” is the volume of data being generated/available. Large amounts of data are being generated every minute. Through multiple avenues. The volumetric rate of data creation is accelerating, as well. It’s been estimated that **90%** of the worlds data has been generated in **the last two years**.

Velocity -- Data is **streaming in** at an unprecedented rate

Variety --

- Often includes **text and multimedia content**
- **Difficult to categorize** all elements
- Email | Word Documents | Texts



So where does Big Data see potential use?



Everywhere.

Big Data exists everywhere, and drives many decisions across business processes.

In places it wouldn't have previously been considered, Big Data is about finding new means for analyzing and acting upon data that is sometime already present in some form.



Elections -- Politicians are using **social media analytics** to determine **where they have to campaign the hardest** to win the next election.

Sports -- Video analytics and sensor data of baseball or football games is used to improve performance of players and teams. For example, you can now **buy a baseball with over 200 sensors** in it that will give you detailed feedback on how to **improve your game**.

Traffic -- GPS information on where our phone is and how fast it is moving is now used to **provide live traffic updates**.

Retail -- data analytics can predict **when people will shop, how they pay and even how many calories they consume**

Business

PRICING



WORKFORCE



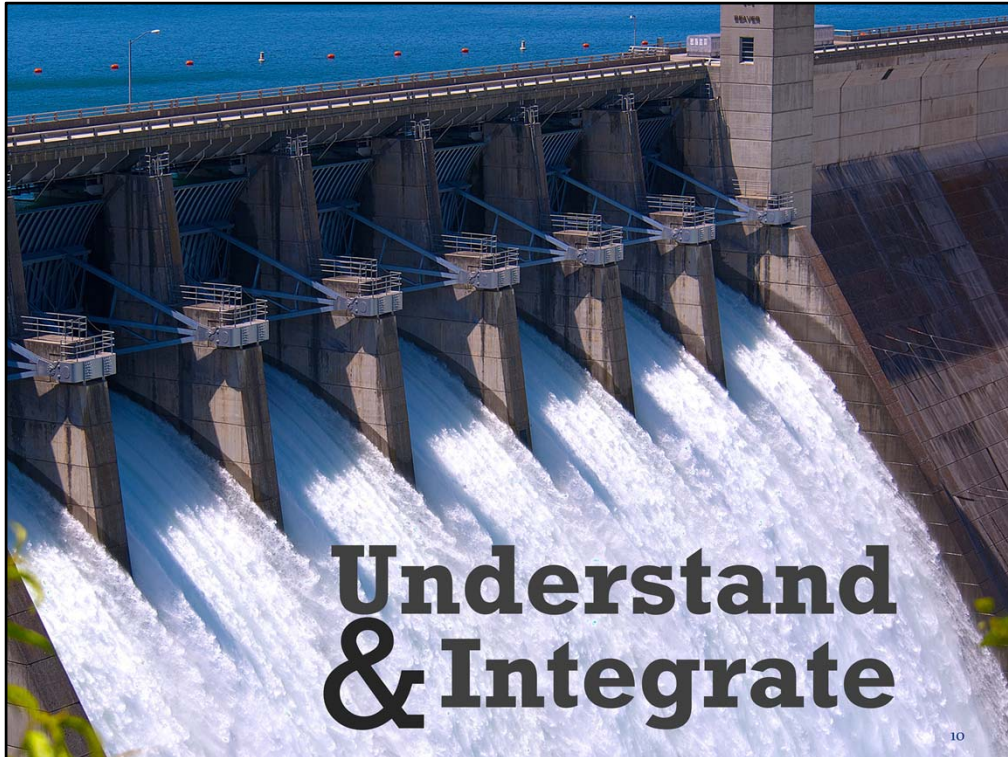
CONSTRUCTION



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9

- **Pricing** -- Macy's **price optimization** of 73 million items for sale **from over 27 hours** to just over **1 hour**. Amazon can predict the likelihood of you purchasing a product and ship it to you before you buy...
- **Workforce** -- New tools provide **deep data analysis** on **seemingly unrelated data points** like: gas prices, unemployment rates, social media usage. Can **predict** when an employee is **most likely to leave his job**.
- **Construction**
 - **GPS devices** to monitor data such as **idle time, cycle times, productivity** were installed on equipment necessary to complete earthmoving of the SX Railroad's
 - new ways of looking at **productivity data using jobsite video and images**
 - Hill Construction worked found a **data analytics tool** to analyze **risk and quality** in project **schedules**



It's imperative now for businesses to **Understand** and **Integrate** these lessons to be able to realize a competitive advantage in the market.

As shown in the previous examples, keys to Understanding & Integrating

- **Utilizing unstructured data** in business
- **Data Analysis**
 - Finding **relationships** and

patterns

- **Integrating unstructured and structured data**



Big Data in Shipbuilding

So where can Big Data be used in the Shipbuilding enterprise?
Simple.



As was mentioned before, **EVERYWHERE**.

Like any other industry, Big Data touches EVERY process and department across the shipbuilding enterprise.



Current Challenges

What are the current challenges facing the shipbuilding enterprise in implementing/utilizing Big Data concepts?

UNAWARE
of the **power** of the data
that already exists in the yard

Existing tools need to be
MORE USER FRIENDLY

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14

Decision-makers may not be aware of the power of the data behind most of their organizations operations.

This doesn't mean they have to be intimately familiar with it, but rather that it exists at all, and ways that it may be exploited for improved business processes.

Various existing tools for data storage/analytics often provide small benefits when they are not user friendly or easy to understand for end-users or decision-makers.



Targeting solutions like:

- Fast, accurate reporting
- Data mining and analysis
- Gap Analysis (Training, Technology)
- Virtual solutions
- User-friendly interface
- Training across all departments/divisions, including **management**

Strategic Investment Plan



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17

Word cloud for the Strategic Investment Plan

Recent Projects moving in right direction

➤ **USER-FRIENDLY**

➤ Developed from **END-USERS NEEDS**

➤ **CUSTOMIZED COTS** – cost effective

➤ Utilizing existing **DATA IN NEW WAYS**

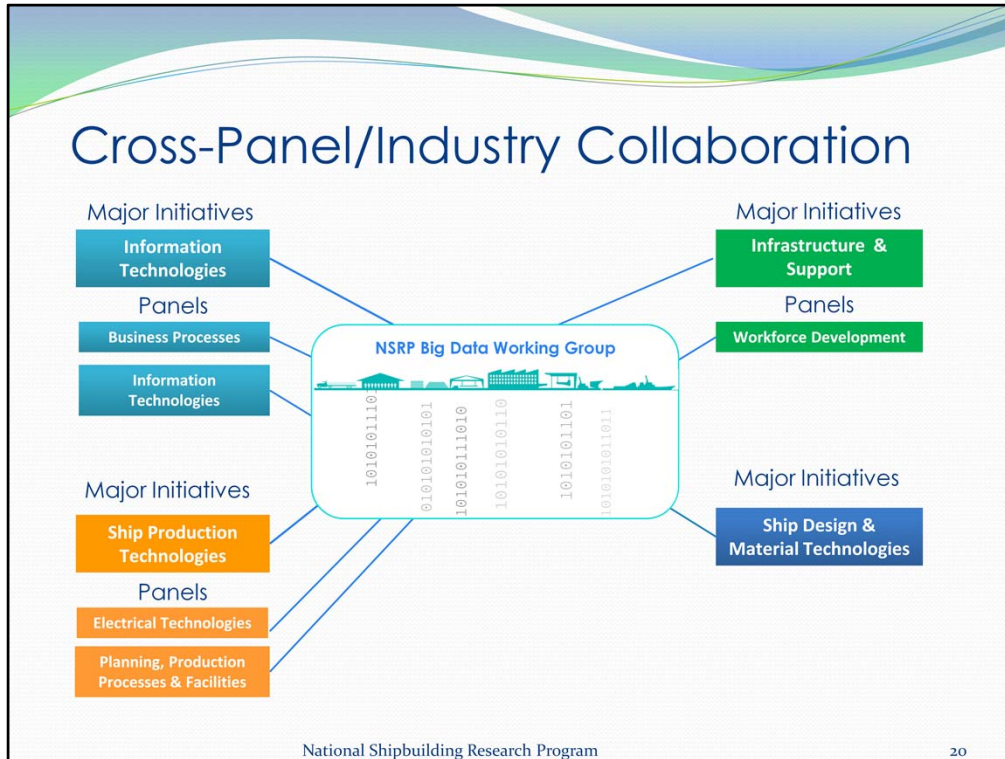
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18

- Ship Cable Management
- Visualization System for CPC
- Production Planning with CAD
- Leveraging Detailed Design in Weight Engineering
- ERP Integration with CAD
- Robust Function Paperless Paint
- Data Management Applications
- Ship Warfare Systems Interface Descriptions
- Requirements for a Shipbuilding Drawingless Environmental

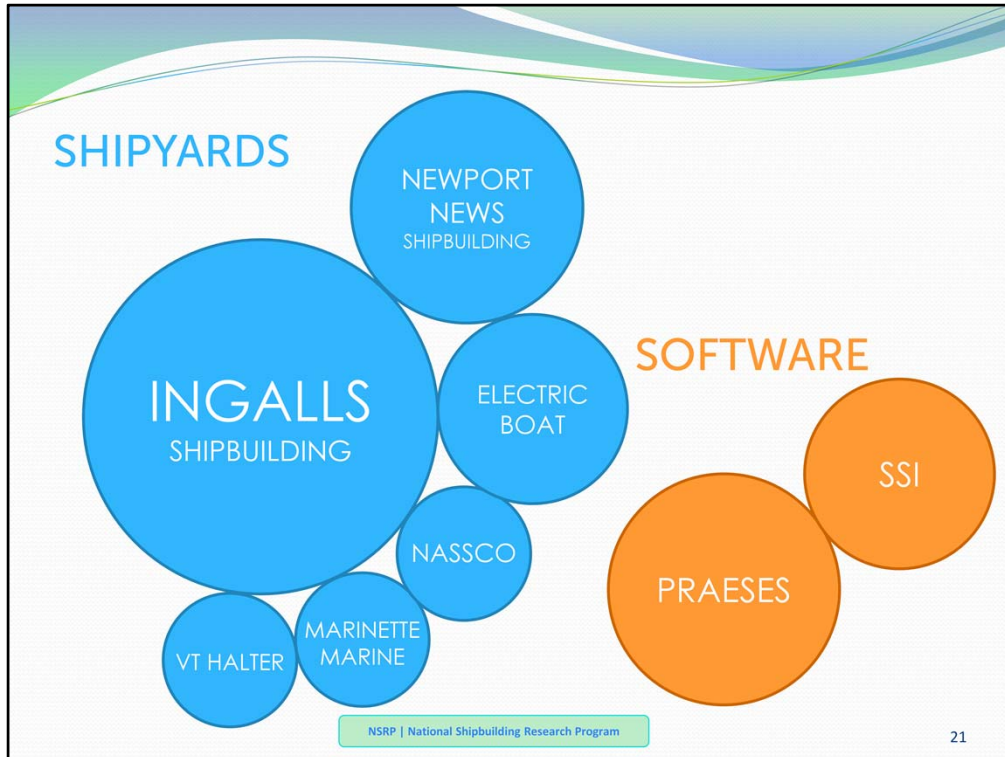


Cross-Panel
Working Group



Formal and informal discussions at panel meetings and project team meetings surrounding this topic:

- how **Big Data** impacts shipyards
- how can **NSRP** play a role
- Working Group formed from “**ground up**” to examine these issues and formulate solutions
- Comprised of **NSRP Extended Team Members and industry reps** whose background and expertise aligns with topic
- **Cross-Panel/Industry Collaboration – CORE OBJECTIVE OF THE PROGRAM**



Each circle is scaled by number of participants from each company involved in the working group.

Actual breakdown of working group members by company:

Ingalls shipbuilding: **7**

Newport News shipbuilding: **3**

Electric Boat: **2**

NASSCO: **1**

Marinette Marine: **1**

VT Halter: **1**

Praeses: **3**

SSI: **2**

The **most important** aspect of the working group is that it was formed through the collaboration between many shipyards as part of a desire to better understand and utilize aspects of Big Data.



There is a strong representation across the NSRP as well as the shipyards. The full list of participants:

Jeb Baugh

Praeses

Member-Business Processes Panel

Project Lead/Participant, IT-Data-related projects

Dave Bennett

Newport News Shipbuilding

Chair

Workforce Development Panel

Jamie Breakfield

Ingalls Shipbuilding

Vice Chair

Information Technologies

Patrick David

SSI – ShipConstructor Software

Member-Business Processes Panel

Project Lead/Participant, IT-Data-related projects

Steve Davis

Praeses

Project Lead/Participant, IT-Data-related projects

Mark Debbink

Newport News Shipbuilding

Major Initiative Team Lead

Information Technologies

Jason Farmer

Ingalls Shipbuilding

Chair

Electrical Technologies Panel

Ken Fast

Electric Boat

Chair

Planning, Production Processes & Facilities Panel

Darryl Gibson

Ingalls Shipbuilding

Subject Matter Expert

Brad Goff

Ingalls Shipbuilding

Subject Matter Expert

Mike Leleux

VT Halter

Major Initiative Team Lead

Infrastructure & Support

Denny Moore

Electric Boat

Chair

Information Technologies

Rob Parker

Praeses

Member-Business Processes Panel

Project Lead/Participant, IT-Data-related projects

David Rice

Newport News Shipbuilding

Major Initiative Team Lead
Ship Design & Materials

Patrick Roberts

SSI-ShipConstructor Software
Vice-Chair
Business Processes Panel

Jeff Schaedig

NASSCO
Major Initiative Team Lead-at-Large

Virgel Smith

Ingalls Shipbuilding
Chair
Business Processes Panel

Luke Tomberlin

Marinette Marine
ECB Member

Terry Walley

Ingalls Shipbuilding
Subject Matter Expert

John Walks

Ingalls Shipbuilding
Major Initiative Team Lead-at-Large



Brainstorming Session in March to discuss:

1. Industry survey results
2. Raising industry awareness
3. Project Ideas



Industry Survey Results



Industry survey was conducted earlier this year. The majority of the respondents were shipyards.



Raising
Industry Awareness

Stakeholder Engagement Plan

**BRIEFING INDUSTRY
& NAVY** Through NSRP Panel Meetings
ROBUST DISCUSSION
POSITIVE FEEDBACK

**EDUCATE
& INFORM** **DECISION MAKERS**
including
ECB MEMBERS

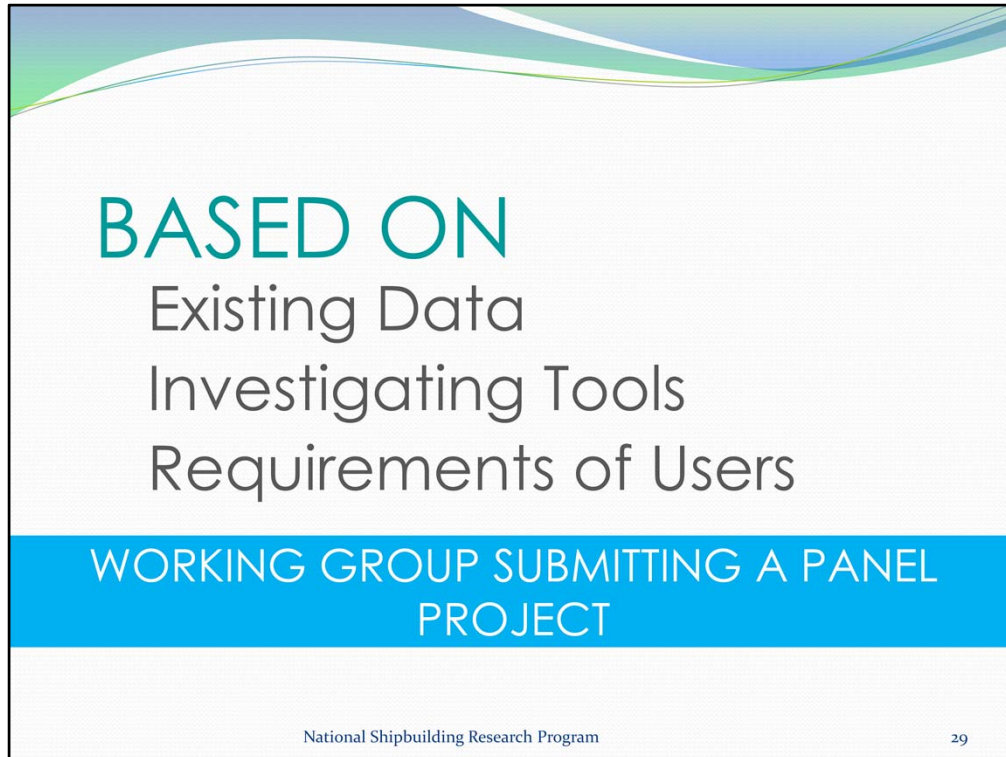
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27

- Working Group has been **briefing industry and Navy** through NSRP Panel Meetings this Spring – **robust discussion, positive feedback**
- **Educate** and inform **decision-makers**, including **ECB members**



Project Ideas



Big Data Analytics Tools Investigation Project Goals and Objectives

Investigate COTS data analytics tools for data manipulation

Test **capabilities and applicability** through integration of pre-determined data set

Provide **metrics and recommendations** on most effective tools, including level of effort for **customization and ease of use for end-users**

Questions