Bridging Big Data 2016

Putting Bridge Data to work for you

The Challenge

THERE IS NO SHORTAGE OF
BRIDGE STRUCTURAL HEALTH DATA
TO MEASURE AND COLLECT

THE "REAL" CHALLENGES ARE OF
DATA DISCOVERY AND
WHAT TO DO WITH ALL OF THE DATA

5 V's of Big Data

Volume

Velocity

Variety

Veracity

Value

2

Results from 2015 Workshop

OPTIMIZING EMERGING TECHNOLOGIES FOR SMARTER BRIDGES
BRIDGE-ING
· BIG DATA WORKSHOP ·
OMAHA, NE ● OCT 8-9, 2015

understand return on investment offered by integration of technology and Big/Smart Data into management processes

shift from producing "Big Data" to producing "Smart Data".

extensive pool of transportation infrastructure data already exists and this data needs to be better mined

standardize and integrate sensor technologies, platforms and Big/Smart Data management principles
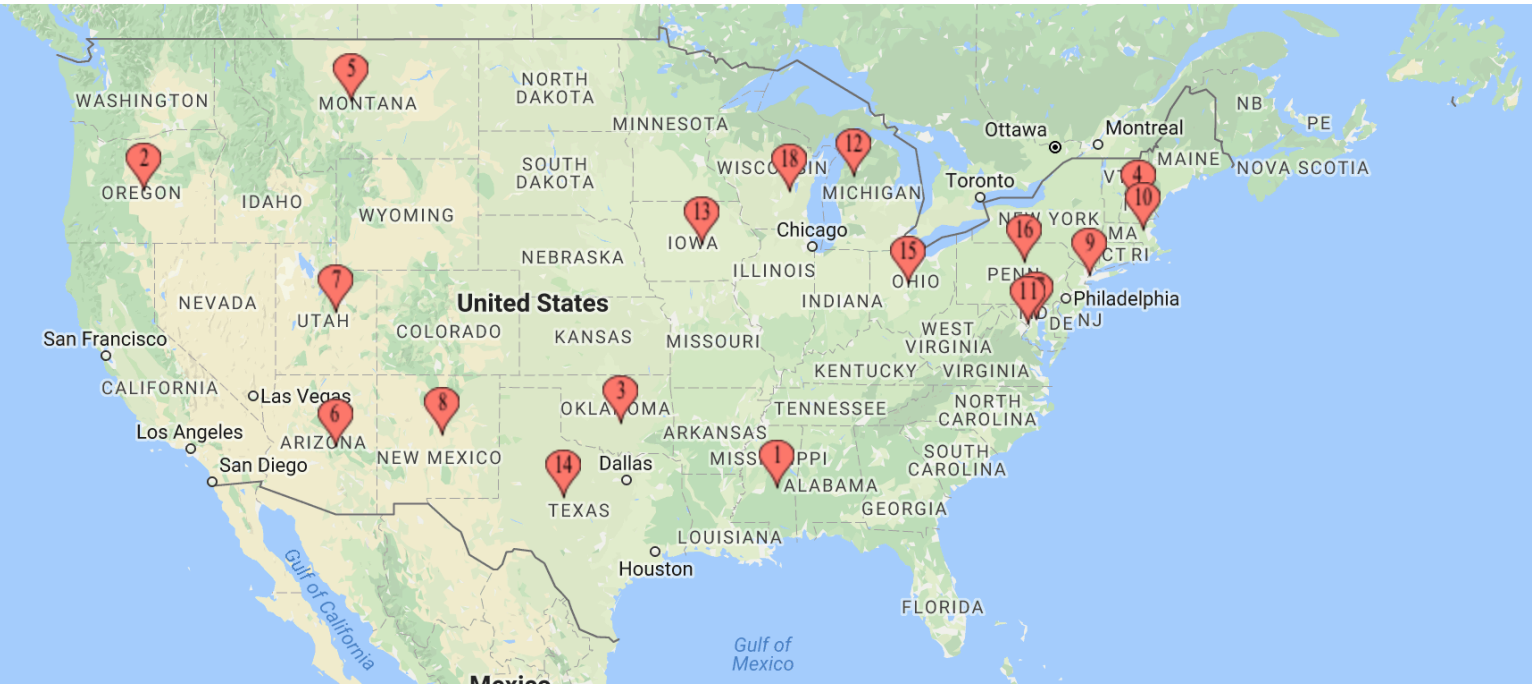
technology advancements will have a profound influence on future use of transportation infrastructure and the built environment.

The Challenge

- Bridge Health Data characteristics:
  - Specialized Formats
  - Diverse data Ownership, and Use Licenses
  - Typically not ready for Data Science
(Images, PDF documents, Drawings)
  - Different Sources (Manual Inspection, Sensors)
  - Varying Data Quality
  - Lack of clarity related to Standardization
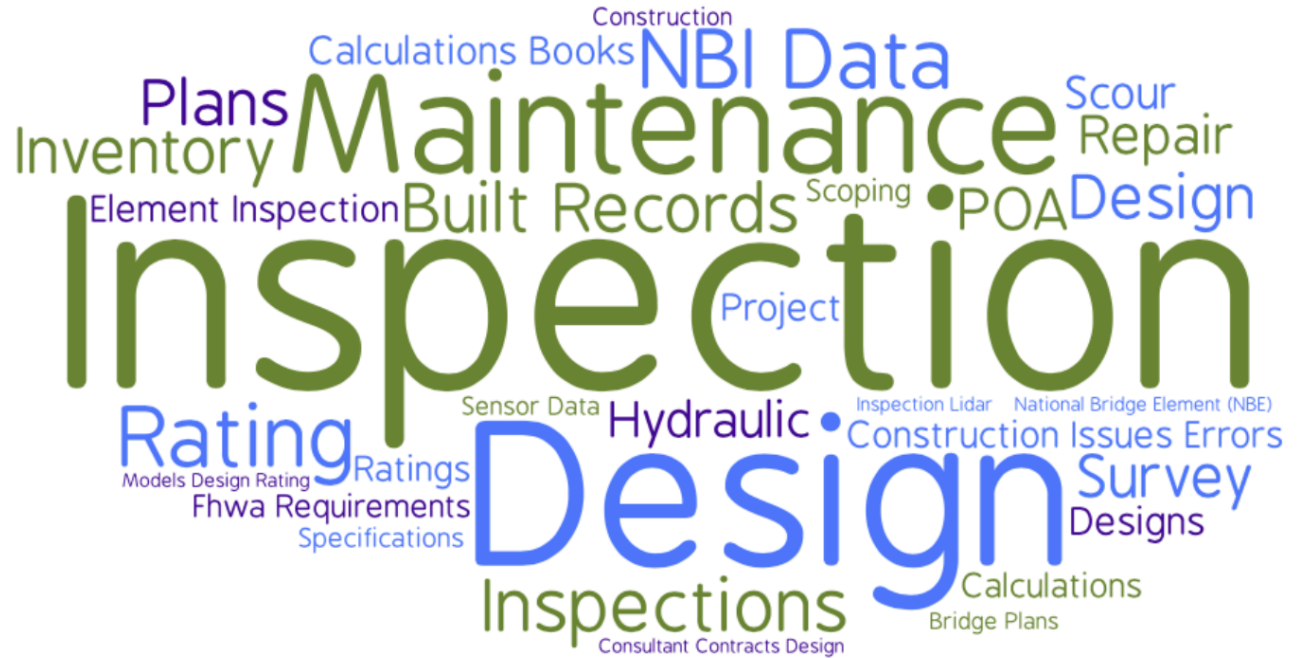
Preliminary Survey

Bridge information

18 State DOT responses, 6 did not report name and location

Preliminary Survey

What type of bridge information do you have?

Inspection	14
Maintenance	12
Design	6
Inspections	5
NBI Data	4
Rating	3
Built Records	2
Inventory	2
Construction Issue…	1
Design	1
Calculations Books	1

Preliminary Survey

How do you use the Bridge related information?

Planning	10
Analysis	7
Budgeting	7
Asset Management	3
Prioritizing	2
Maintenance	2
Budget	2
Project Planning	2
Prioritizing Replace...	1
Streamlining Const...	1

Big Data Innovations for Bridge Health

- Sponsored by NSF (Solicitation: 16-510)
    - Big Data Regional Innovation Hubs: Establishing Spokes to Advance Big Data Applications
    - https://goo.gl/1d6WN2
- Joint effort
    - College of Info. Science and Technology (UNO)
    - College of Engineering (UNL)
    - Academic, Public and Industry Partners

Project Goals

- Build a community of practice

- Identify opportunities with big data technologies for bridge health monitoring

- Address challenges of data discovery and controlled sharing

- Transition bridge health monitoring data into pipelines that enable data science

Activities

- Catalog bridge datasets, including:
    - Intellectual property
    - Licensing and use agreements
    - Data science capabilities
- Obtain commitments for data sharing
- Identify innovative applications for understanding bridge health with owners, industry and researchers

Current Supporters

- H.V. Jagadish, University of Michigan

- Michael N Grussing, Johnette (Johnnie) Shockley, US Army Engineer Research and Development Center (ERDC)

- Melissa Cragin, Executive Director, Midwest Big Data Hub

- Santiago Pujol, Purdue University, datacenterhub.org

- Mark J. Traynowicz, Nebraska Department of Roads

- Todd Wimmer, Union Pacific Railroad

- Sean Goggins, University of Missouri, https://github.com/OCDX
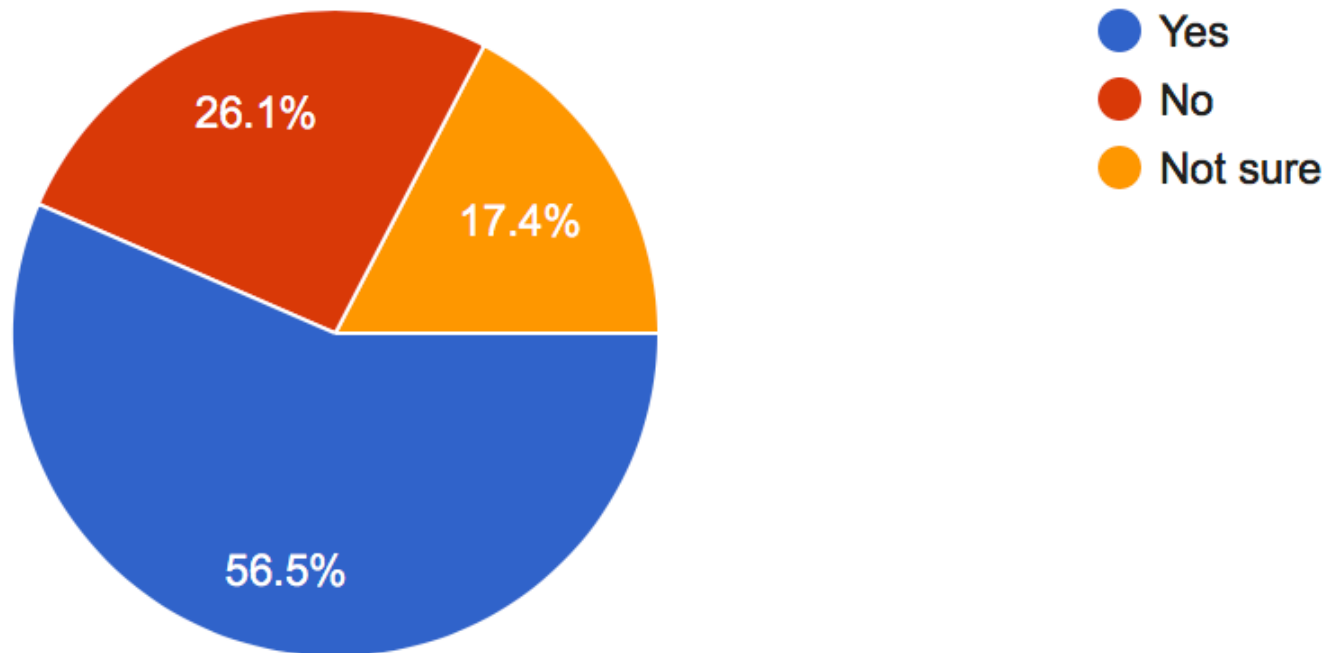
- **Looking for more...**

Prototypes

- Existing datasets
  - NBI Data Pilot
  - NDOR Bridge Maintenance Data
  - DataHub Bridge datasets
- New datasets
  - UP bridge health monitoring
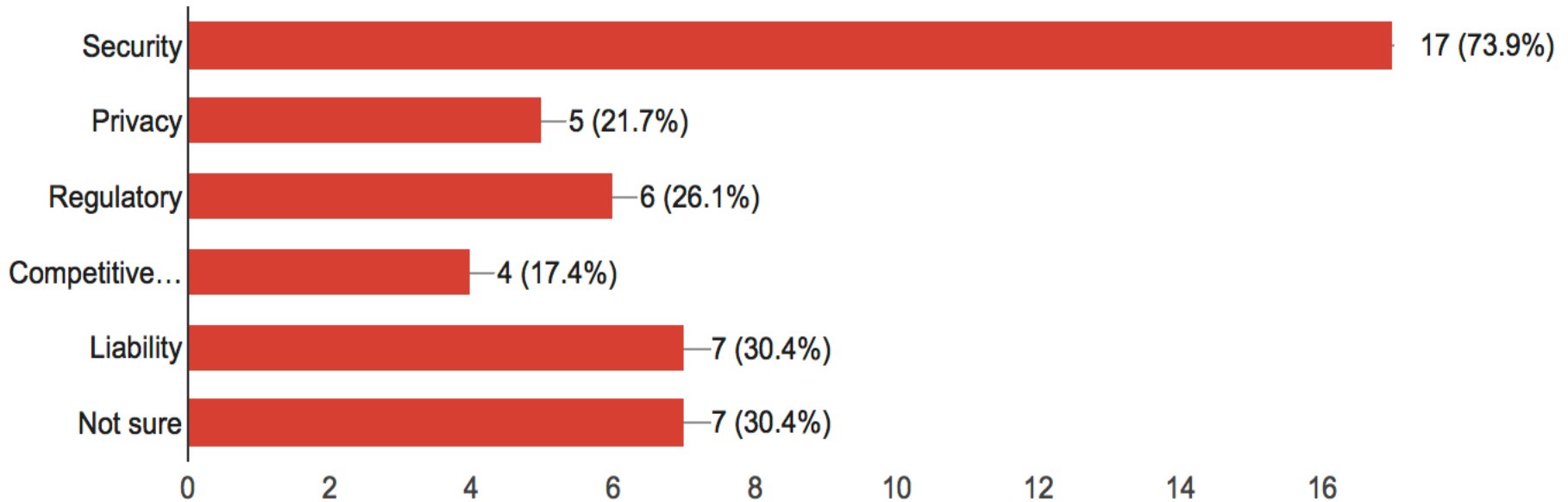- Common Schema for Bridge Health
  - Working meetings
    https://github.com/BridgingBigData/bridgehealthschema/

Preliminary Survey

Are you allowed to share your data?

Preliminary Survey

What concerns do you have for your data?

What's Next?

- Share workshop report

- Small collaboration meetings

- 2nd Workshop in Mid-Summer 2017

    - Outcomes of activities, pilots and future plans

- Respond to funding opportunities with partners

BBD 2016 Attendees

Questions

Project website:
https://bridgingbigdata.github.io