



MANAGING OUR EVERGROWING INFRASTRUCTURE *BIG DATA*

A Presentation to



By

Zhong Chen, PE, PLS

December 2, 2016

Background

- uGRIDD is a Dynasty Group Development
- Consulting Engineers and Land Surveyors
- Established in 1994
- Services in the areas of transportation, building, industrial facilities and historic preservation
- Area of Services
 - Design Engineering
 - Surveying
 - BIM/GIS Support
 - Construction Engineering
 - Nondestructive Testing



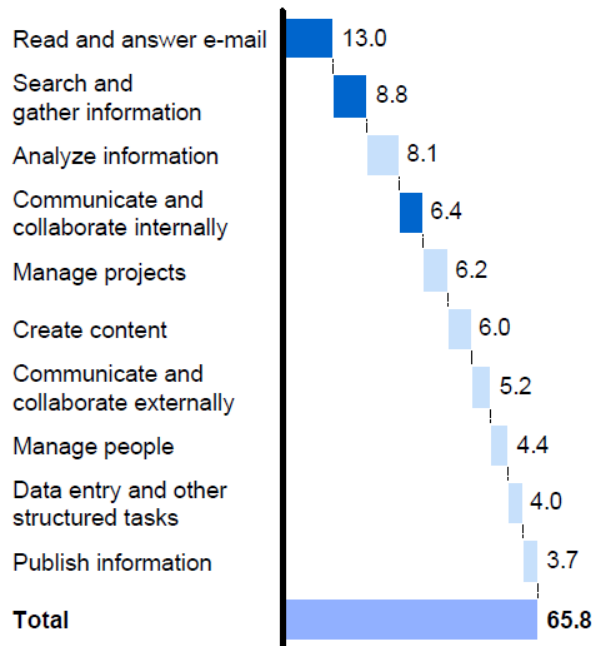
We Capture/Create a Lot of Data, and We Spent a Lot of Time to Find the Data

Exhibit A7

We adjust IDC data to estimate time spent on different activities by a typical interaction worker

Hours per week per activity

Activities in IDC report

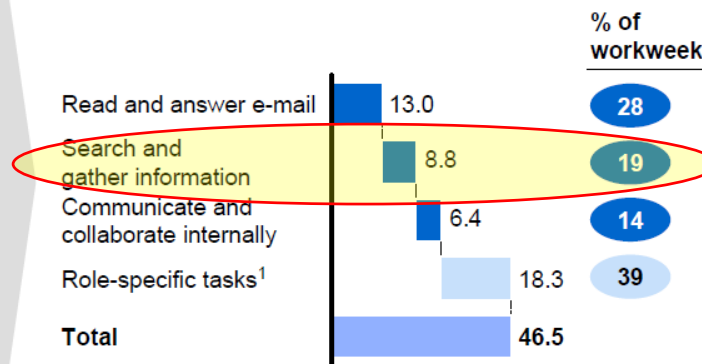


■ Mandatory activities for interaction workers

■ Other activities

Adjusted activity list

Average workweek of people responding to the survey



¹ Included activities depends on specific role, e.g., project management, content creation, people management, data entry, and information analysis.

SOURCE: IDC; McKinsey Global Institute analysis

McKinsey Global Institute



July 2012

The social economy:
Unlocking value and
productivity through
social technologies

McKinsey Global Institute

We Capture/Create a Lot of Data, and We Spent a Lot of Time to Find the Data



College of Engineering

For You ▾

About Us ▾

Our People ▾

Academics ▾

Research ▾

Engagement ▾

Giving ▾

Schools ▾

Programs ▾

Intranet ▾

PURDUE / ENGINEERING / ABOUT US / NEWS / PUBLICATIONS / ARCHIVE / RETIRED PER WILL SONDERGATH'S REQUEST (RELAYED BY DAVID ALLEN OF PMM) / ENGINEERING EDGE / 2004

Overview

Meet the Dean

Administrative Offices

Diversity

News

Events

History

Research and Education Center for Information Systems in Engineering: Design Time Better Spent

Purdue researchers have developed the first system capable of searching a company's huge database of three-dimensional parts created with computer-aided design software.

Such "parts search engines" could save time and millions of dollars annually by making it easier for companies to "reuse" previous designs, benefiting from the lessons learned in creating past parts.

"Designers spend about 60 percent of their time searching for the right information, which is rated as the most frustrating of engineers' activities," says Karthik Ramani, a professor of mechanical engineering and director of the Purdue Research and Education Center for Information Systems in Engineering. "The whole power of computers is lost if you are not able to retrieve and 'reuse' what you have created in the past."

The new system enables the selection of an inventoried part that resembles the desired part and retrieval of a "cluster" of like items. Users also can sketch the desired part entirely from memory, or they can choose a part

Purdue's Engineering Edge

Addressing Grand Challenges (2009) Profiles in Research (2008) Where Breakthroughs Begin (2006) Research with a World View (2005) Integrated Research, Infinite Possibilities (2004) Nanotechnology at Purdue University (PDF, 1.24 Mb) (2003) Discovering a Better World Today (2002)

"Designers spend about 60 percent of their time searching for the right information, which is rated as the most frustrating of engineers' activities," says Karthik Ramani, a professor of mechanical engineering and director of the Purdue Research and Education Center for Information Systems in Engineering. "The whole power of computers is lost if you are not able to retrieve and 'reuse' what you have created in the past."

information has been created and used, it is often stored and forgotten. As a result, industry loses a lot of money by not being able to reuse earlier parts. The proverbial wheel is reinvented many times."

How to manage the data we captured and created so that we can **reuse** them when needed?

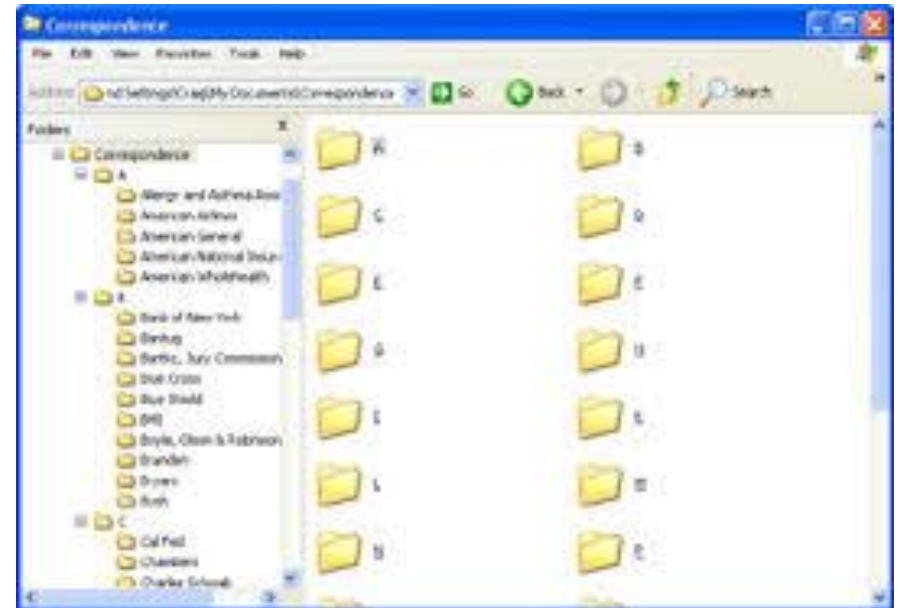
- The best time to archive data is at when it was captured/created
- Put the data where it belongs – Everything is somewhere
- The question is if the current technology can help us do it



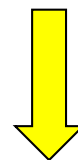
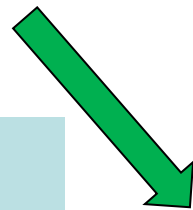
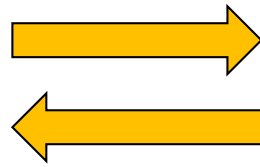
The Limitations of the Current Technology – File Server, FTP, Drop Box, etc.

Data Folder by Project Number

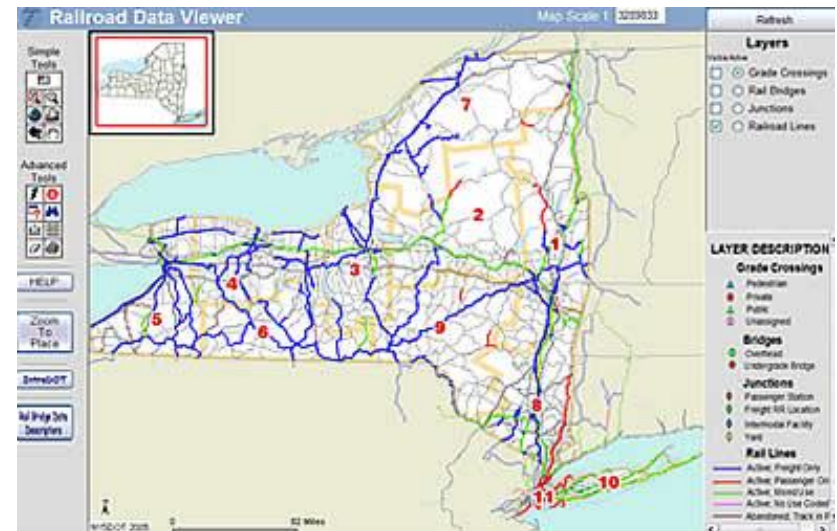
- Very little to none metadata available for data query
- Limited accessibility to most stakeholders
- Expensive software and training investment



The Limitations of the Current Technology - GIS



- Dedicated professional staff / limited capacity to process
- Expensive software and training investment
- Accuracy loss due to digitization and extraction from source data
- Lack of ability to preserve and share raw data



Concept I: Everyone Publishes!

	A	J	K	N	O	P	R	S	T	U
	Point	Latitude	Longitude	Northing	Easting	Elevation	Surface Elev	Description	Source	Link
2	AA9895	N 35-52-48.51645	W 110-36-40.0363	459525.1679	1399644.8490	1719.9425	1720.1425	2 1/2" Disc in Concrete	NGS	http://www.ngs.noaa.gov/cgi-bin/ds_mark.pl?PidBox=AA9895
3	AC6816	N 36-55-1.37514	W 111-26-48.1997	575794.8976	1326491.4545	1314.4108	1314.6508	3 1/2" Disc in Rock Outcrop	NGS	http://www.ngs.noaa.gov/cgi-bin/ds_mark.pl?PidBox=AC6816
4	AC6842	N 35-39-8.59941	W 109-3-58.17727	433763.6749	1539296.4404	2048.5717	2048.6717	1/2" Rod in Monument Well	NGS	http://www.ngs.noaa.gov/cgi-bin/ds_mark.pl?PidBox=AC6842
5	AI1911	N 36-46-19.87237	W 110-58.92042	558081.8986	1453890.4156	1690.0135	1690.0135	3 1/2" Disc in Rock Outcrop	NGS	http://www.ngs.noaa.gov/cgi-bin/ds_mark.pl?PidBox=AI1911
6	AI1925	N 34-57-37.35664	W 110-48-24.2280	357672.1528	1380614.6836	1587.0448	1587.0448	3 1/2" Disc in Concrete	NGS	http://www.ngs.noaa.gov/cgi-bin/ds_mark.pl?PidBox=AI1925
7	AI1928	N 35-18-33346	W 110-48-7.85757	395366.7804	1381530.0796	1446.6172	1446.1872	2 1/2" Disc in Concrete	NGS	http://www.ngs.noaa.gov/cgi-bin/ds_mark.pl?PidBox=AI1928
8	AI5438	N 35-40-52.88513	W 108-8-45.43295	437742.0396	1622602.3904	2152.1078	2152.1078	2" Disc in Rock Outcrop	NGS	http://www.ngs.noaa.gov/cgi-bin/ds_mark.pl?PidBox=AI5438
9	AJ5640	N 36-2-26.77488	W 111-49-48.9234	479298.5570	1289962.1698	2286.6511	2286.5011	2 1/2" Disc in Concrete	NGS	http://www.ngs.noaa.gov/cgi-bin/ds_mark.pl?PidBox=AJ5640
10	FO1662	N 35-57-20.50356	W 107-39-42.5045	468905.0036	1665864.6340	2040.3612	2040.0012	3 1/2" Disc on Iron Pipe	NGS	http://www.ngs.noaa.gov/cgi-bin/ds_mark.pl?PidBox=FO1662
11	FP0373	N 35-28-21.79178	W 108-55-33.6112	413890.1220	1552108.7827	1929.6405	1929.7905	1/2" Rod in Monument Well	NGS	http://www.ngs.noaa.gov/cgi-bin/ds_mark.pl?PidBox=FP0373
12	FP0392	N 35-12-32.94063	W 109-20-52.3105	384498.0261	1513856.6907	1783.1201	1783.4501	1/2" Rod in Monument Well	NGS	http://www.ngs.noaa.gov/cgi-bin/ds_mark.pl?PidBox=FP0392
13	FP0526	N 35-47-7.69282	W 108-34-31.9029	448842.0927	1583596.9425	1956.8284	1956.5924	3 1/2" Disc in Concrete	NGS	http://www.ngs.noaa.gov/cgi-bin/ds_mark.pl?PidBox=FP0526
14	FP0671	N 35-5-3.83904	W 108-47-16.7922	370878.3368	1564950.2252	1968.1425	1968.2025	1/2" Rod in Monument Well	NGS	http://www.ngs.noaa.gov/cgi-bin/ds_mark.pl?PidBox=FP0671
15	FP0714	N 35-30-50.89992	W 108-46-56.8883	418572.6900	1565105.4085	1970.9360	1971.0860	1/2" Rod in Monument Well	NGS	http://www.ngs.noaa.gov/cgi-bin/ds_mark.pl?PidBox=FP0714
16	FQ0102	N 35-20.20434	W 110-38-18.6434	362501.2375	1396041.4757	1481.7359	1481.6159	2 1/2" Disc in Concrete	NGS	http://www.ngs.noaa.gov/cgi-bin/ds_mark.pl?PidBox=FQ0102
17	FQ0146	N 35-39-26.71317	W 110-44-52.1101	434957.3235	1386982.9514	1581.7006	1581.6006	2 1/2" Disc in Concrete	NGS	http://www.ngs.noaa.gov/cgi-bin/ds_mark.pl?PidBox=FQ0146
18	GN0330	N 36-3-34.38845	W 107-57-43.3050	479960.7917	1638592.5384	1867.4708	1867.2608	3 1/2" Disc in concrete	NGS	http://www.ngs.noaa.gov/cgi-bin/ds_mark.pl?PidBox=GN0330
19	GO0146	N 36-40-10.08231	W 108-14-21.1948	547293.8774	1612731.7470	1854.7952	1854.2652	3 1/2" Disc on Iron Pipe	NGS	http://www.ngs.noaa.gov/cgi-bin/ds_mark.pl?PidBox=GO0146
20	GO0178	N 36-29-25.21919	W 108-43-31.3495	526953.0549	1569422.2694	1698.5754	1698.5754	2 1/2" Disc in Rock Outcrop	NGS	http://www.ngs.noaa.gov/cgi-bin/ds_mark.pl?PidBox=GO0178
21	GO0271	N 36-31-37.06193	W 109-31-55.1554	530740.0675	1497134.5970	1707.4882	1707.2482	3 1/2" Disc in concrete	NGS	http://www.ngs.noaa.gov/cgi-bin/ds_mark.pl?PidBox=GO0271
22	GO0505	N 36-4-12.35731	W 109-36-34.3655	480039.4172	1490129.6816	1815.9445	1815.7945	3 1/2" Disc in concrete	NGS	http://www.ngs.noaa.gov/cgi-bin/ds_mark.pl?PidBox=GO0505
23	GO0509	N 36-44-24.13509	W 108-13-10.1466	555150.0950	1614392.3008	1676.7207	1676.9207	1/2" Rod in Monument Well	NGS	http://www.ngs.noaa.gov/cgi-bin/ds_mark.pl?PidBox=GO0509
24	GO0510	N 36-59-56.30914	W 109-2-35.67368	583228.7020	1540667.1250	1479.0243	1478.8943	3 1/2" Disc in Concrete	NGS	http://www.ngs.noaa.gov/cgi-bin/ds_mark.pl?PidBox=GO0510
25	GP0283	N 36-51-58.31297	W 111-30-12.2346	570254.3263	1321322.4181	1337.7731	1337.6731	2 1/2" Disc in Concrete	NGS	http://www.ngs.noaa.gov/cgi-bin/ds_mark.pl?PidBox=GP0283
26	GP0632	N 36-32-44.59334	W 110-29-38.2049	533279.8250	1410985.4116	2233.6022	2233.4522	3 1/2" Disc in Concrete	NGS	http://www.ngs.noaa.gov/cgi-bin/ds_mark.pl?PidBox=GP0632
27	GP0655	N 36-42-46.56178	W 110-42-26.1712	552057.2016	1392113.1746	2170.7645	2170.5645	3 1/2" Disc in Concrete	NGS	http://www.ngs.noaa.gov/cgi-bin/ds_mark.pl?PidBox=GP0655
28	HM0359	N 37-16-15.77061	W 109-35-46.3843	613338.8021	1491463.6002	1337.9397	1338.0397	1/2" Rod in Monument Well	NGS	http://www.ngs.noaa.gov/cgi-bin/ds_mark.pl?PidBox=HM0359
29	HM0377	N 37-10-59.25233	W 109-51-38.9610	603634.4655	1467951.2554	1355.5543	1355.5543	3 1/2" Disc in Rock Outcrop	NGS	http://www.ngs.noaa.gov/cgi-bin/ds_mark.pl?PidBox=HM0377
30	HN0182	N 37-47.64421	W 110-12-3.99429	584942.7441	1437588.7018	1572.6495	1572.5895	3 1/2" Disc in Concrete	NGS	http://www.ngs.noaa.gov/cgi-bin/ds_mark.pl?PidBox=HN0182
31	AZFL	N 35-10-38.30163	W 111-39-25.2908	383113.2985	1303458.8228	2112.0260	n/a	CGPS ARP	CORS	http://www.ngs.noaa.gov/cgi-cors/corsage.pl?site=AZFL
32	FRED	N 36-59-17.97820	W 112-29-57.1353	586120.5548	1232934.5248	1552.6914	n/a	CGPS ARP	CORS	http://www.ngs.noaa.gov/cgi-cors/corsage.pl?site=FRED
33	P008	N 36-8-34.13954	W 111-7-48.12588	489336.9754	1353266.4478	1546.0900	n/a	CGPS ARP	CORS	

Publishing Infrastructure Data Made Easy

uSHOW - uGRIDD

www.ugridd.com/uSHOW

LiDAR2Map

Aerial4Map

Data2Map

KML2Map

Photo2Map

SHP2Map

Video2Map

Video2MapExt

My Pages

uTOOL

uSHARE

uFIND

Account

User Group

Organization

Webmaster

Scan2Map

This tool produces panorama views from LiDAR scan data and displays them on an interactive map.

Tutorial & Demo

ENTER

LiDAR2Map

This tool produces panorama views from LiDAR data and displays them on an interactive map.

Tutorial & Demo

ENTER

Aerial4Map

This tool overlays aerial images / orthophotos on an interactive map.

Tutorial & Demo

ENTER

Data2Map

This tool processes worldwide geo-referenced data and visualizes it on an interactive map.

Tutorial & Demo

ENTER

KML2Map

This tool takes a KML file and overlays it on an interactive map.

Tutorial & Demo

ENTER

Photo2Map

This tool takes multiple photos and generate an interactive album with a map.

Tutorial & Demo

ENTER

SHP2Map

This tool takes a shapefile and overlays it on an interactive map.

Tutorial & Demo

ENTER

Video2Map

This tool synthesizes videos from YouTube with time-location data, and generates a web page.

Tutorial & Demo

ENTER

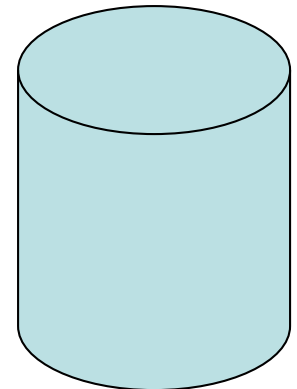
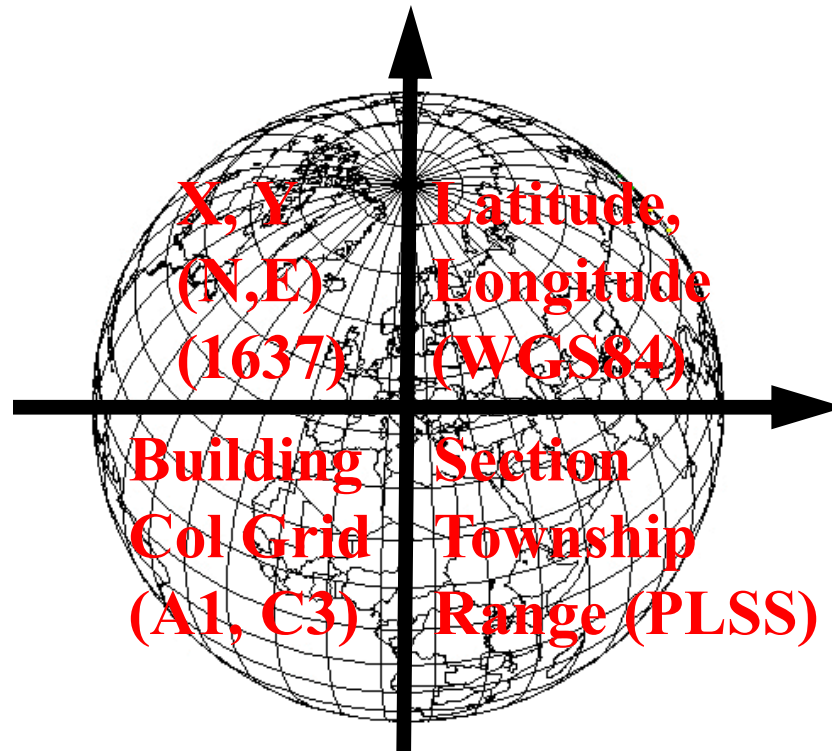
uSHOW

uSHOW is a collection of time-saving tools that process georeferenced data and create map visualizations. A URL is usually the deliverable of the process. The URL can be protected by the uGRIDD username and password. Users can view the map via email invitation with the URL and invitation code.

Concept II: Everything is Somewhere



GRID



User GeoReferenced Infrastructure Data Depository

Bridge



Highway



Railroad/Transit



Facility



Energy



Utility



PROJECT DATA



ORGANIZATIONAL DATA

(Public & Private)



PROJECT DATA SHARING



CLOUD DATA MANAGEMENT

Bridge



Highway



Railroad/Transit



Facility



Energy



Utility



PROJECT DATA



uSHOW

PROJECT
DATA SHARING

Everyone can publish! Project data is organized and published to the project team and archived into the Cloud Data Management system using uGRIDD's SaaS (Software as a Service).

uKAN



uFIND

ORGANIZATIONAL DATA
(Public & Private)

uSHARE

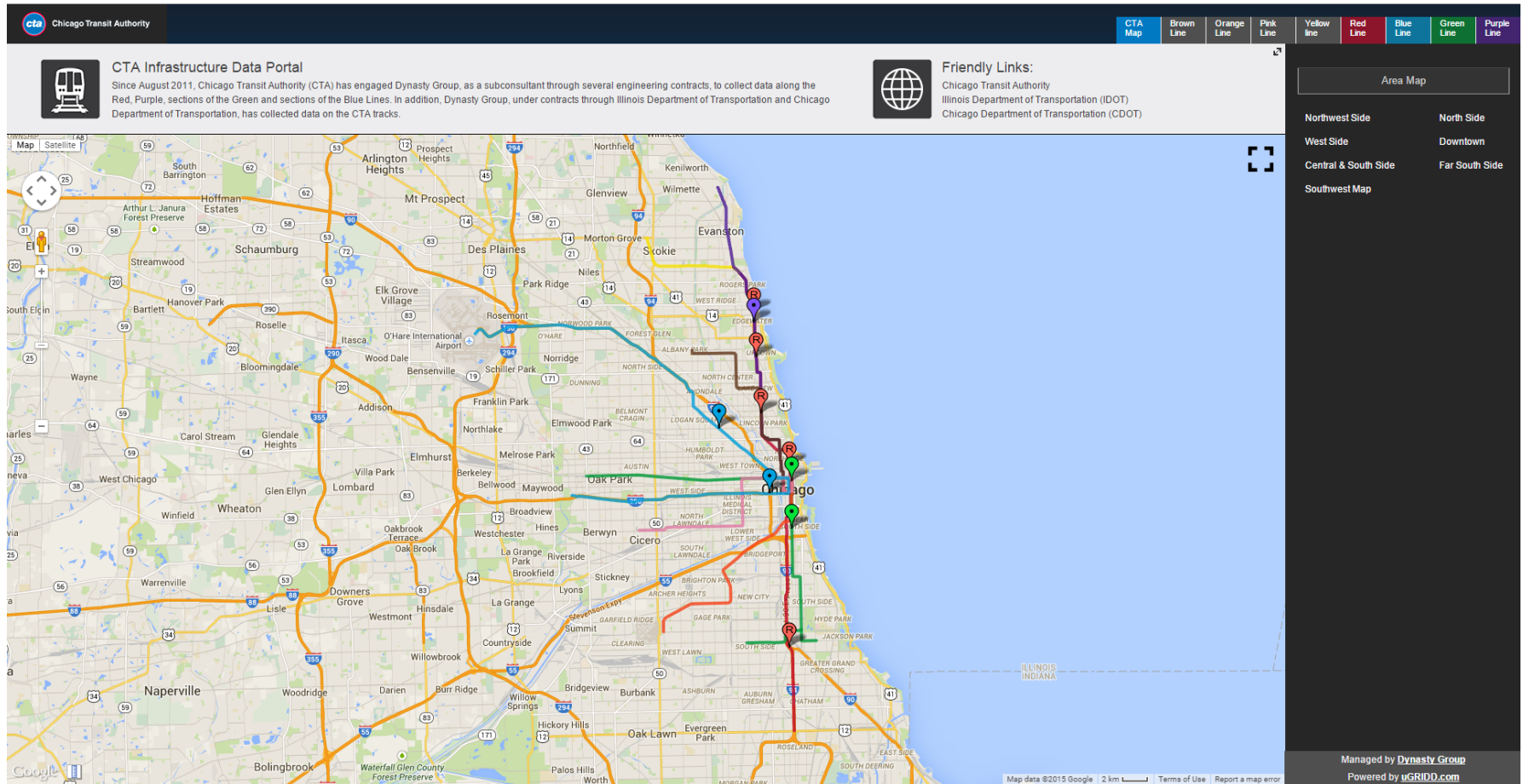
CLOUD
DATA MANAGEMENT

You can find! Public and private infrastructure data, stored by layers on the cloud, can be found based on LOI (Location Of Interest) and other query conditions.

uGRIDDTM

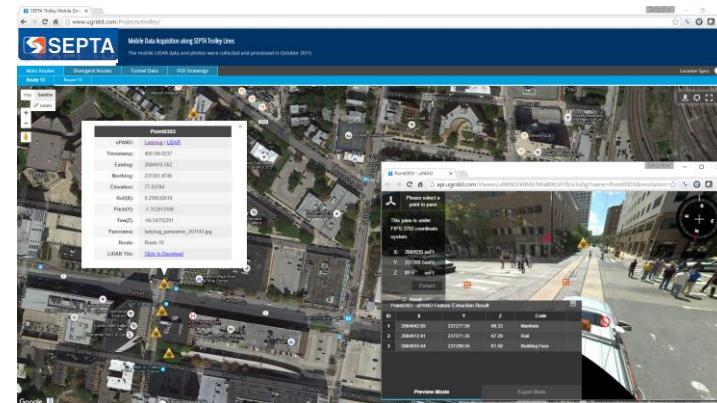
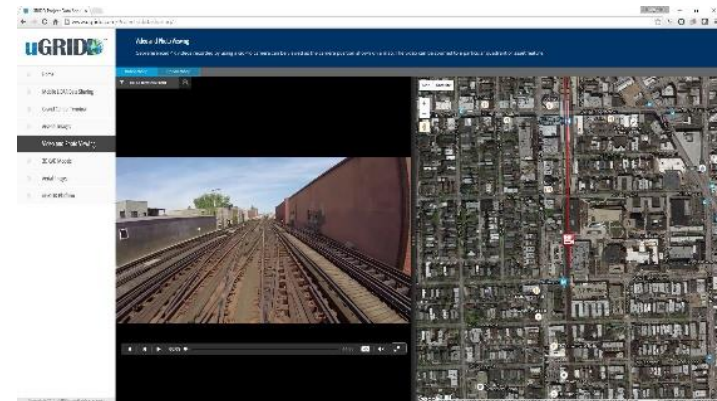
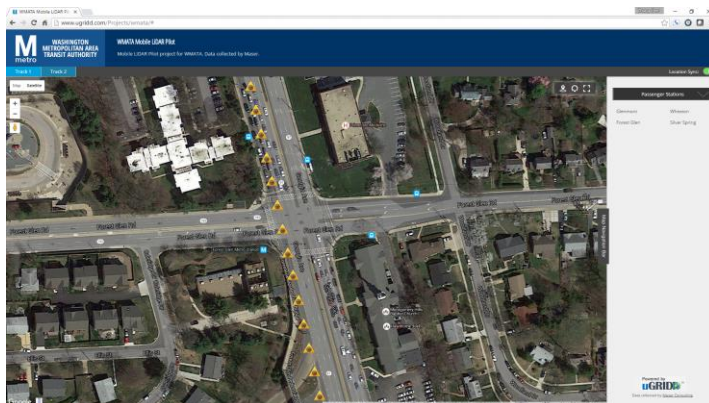
EASILY AND EFFECTIVELY
SHOW-SHARE-HOST-FIND
YOUR INFRASTRUCTURE BIG DATA

CTA Infrastructure Data Hosting: A Customized Solutions with uSHOW & uKAN



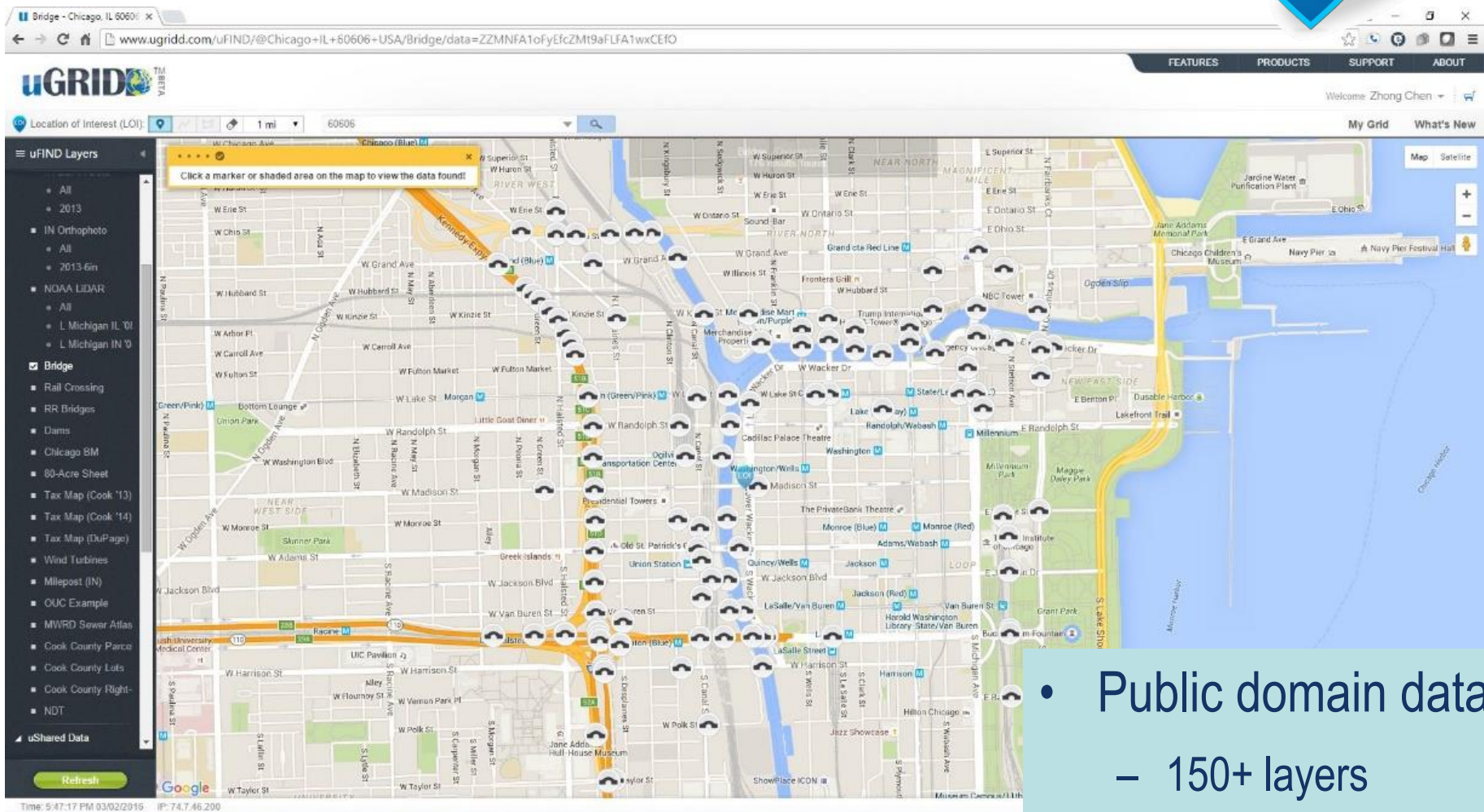
Project Data Sharing Solution: uSHOW & uKAN

- Sample Data Portal
- Data Portal for WMATA & SEPTA



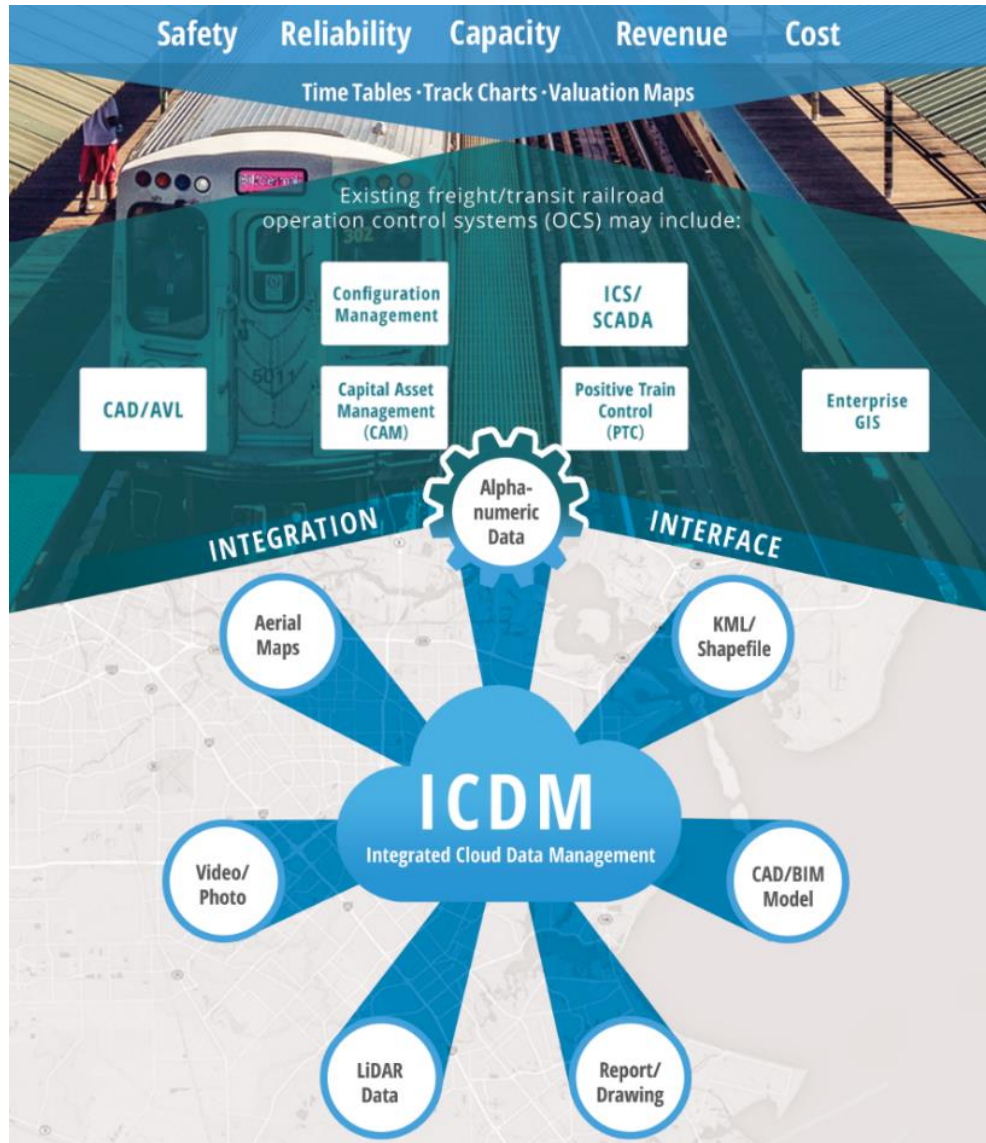
Cloud Data Management Solution: uFIND & uSHOW

LOI



- Public domain data
 - 150+ layers
- Private layers

Future Possibilities: Integrated Cloud Data Management (ICDM)



- Interface with operation control systems
- Easily access to infrastructure big data on mobile and desktop devices
- Make better on-the-fly decisions with latest infrastructure records
- Save time and money on recollecting and locating previously collected data

Thank you!

Questions?