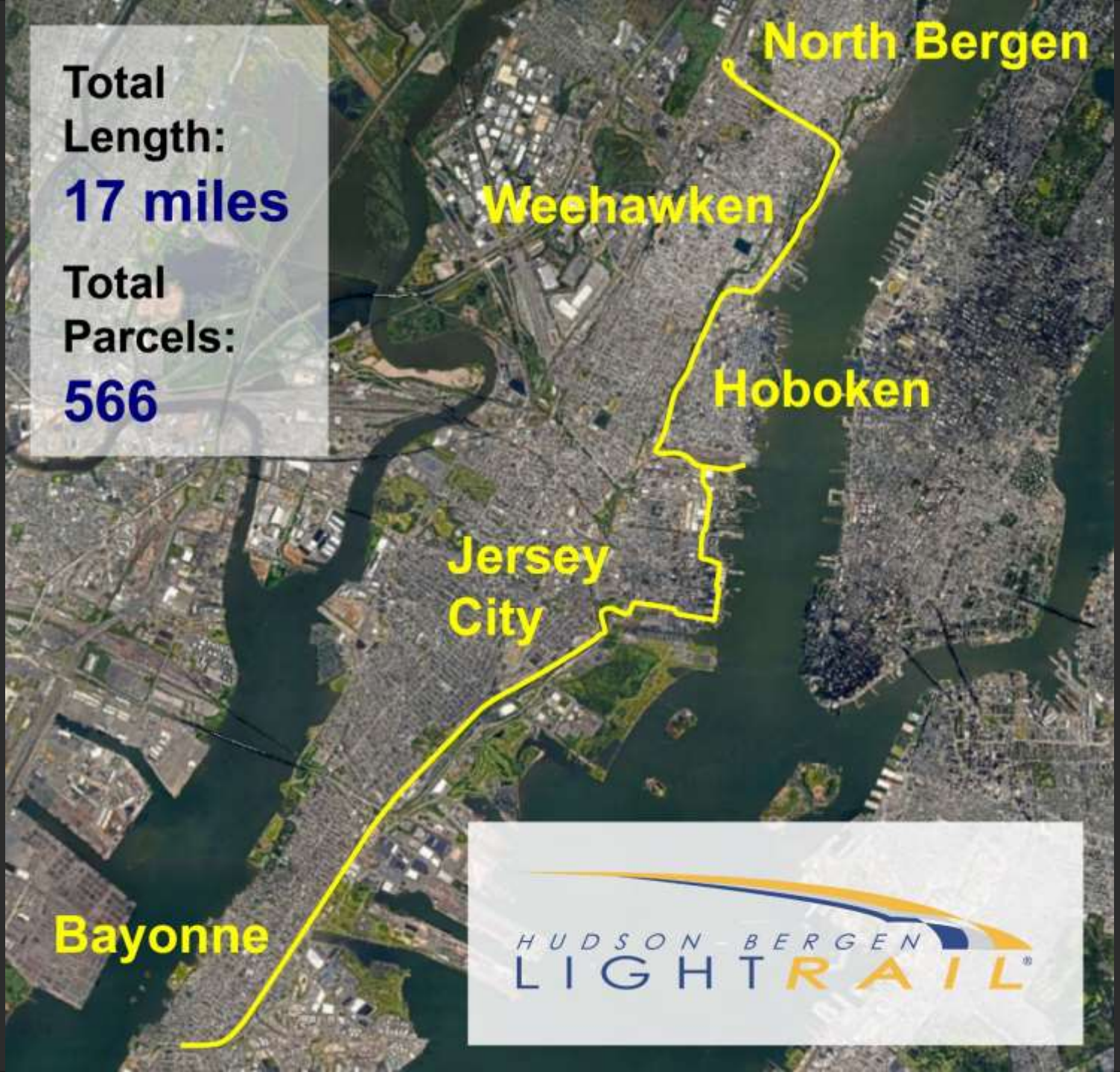
Trends in Automation of ROW Data Management Systems for US State Transportation Agencies

Mark Nardolillo, President & CEO
Jason Rappaport, Software Product Manager
BEM Systems


Total Length:
17 miles
Total Parcels:
566
North Bergen
Weehawken
Hoboken
Jersey City
Bayonne
HUDSON BERGEN
LIGHT RAIL


FIRST NATIONAL BANK
LIGHT RAIL
2039A
TRANSIT
2039A

PAECETRAK™ TIMELINE

HBLR
2003

NJ Transit
2005

NJDOT
2007

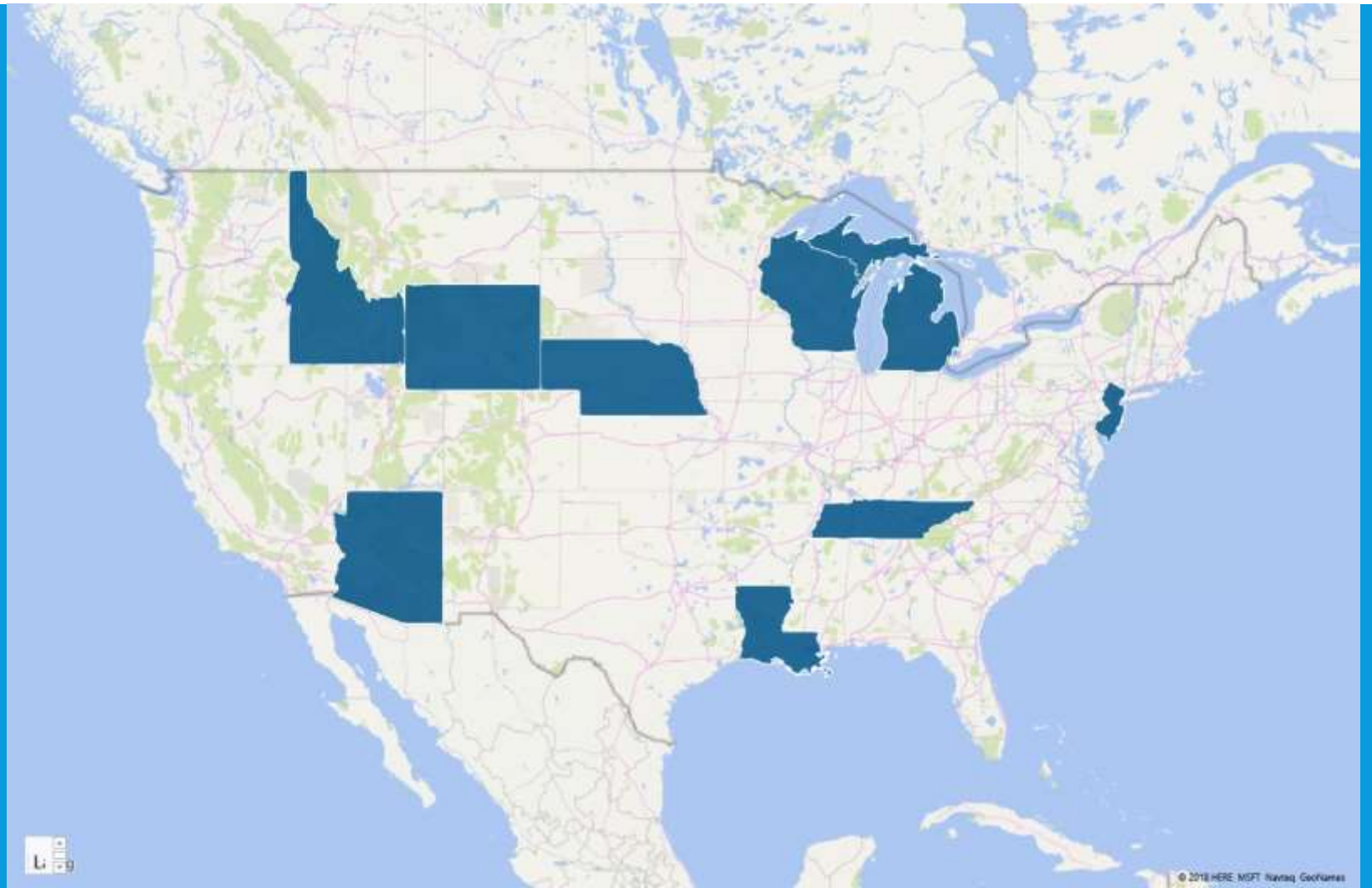
NJSDA
2008

Wyoming
2008

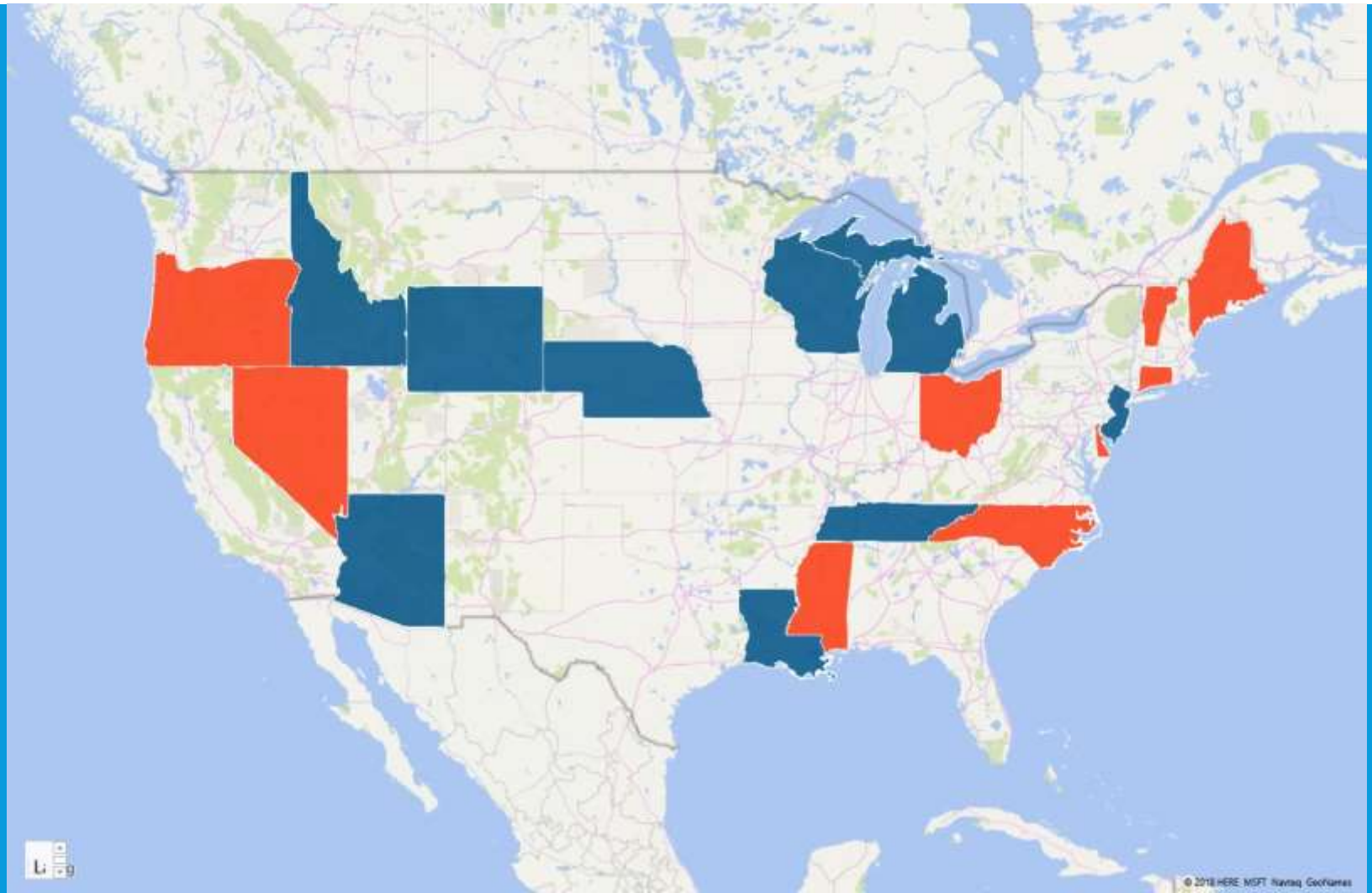
City of Phoenix
2010

COTS!

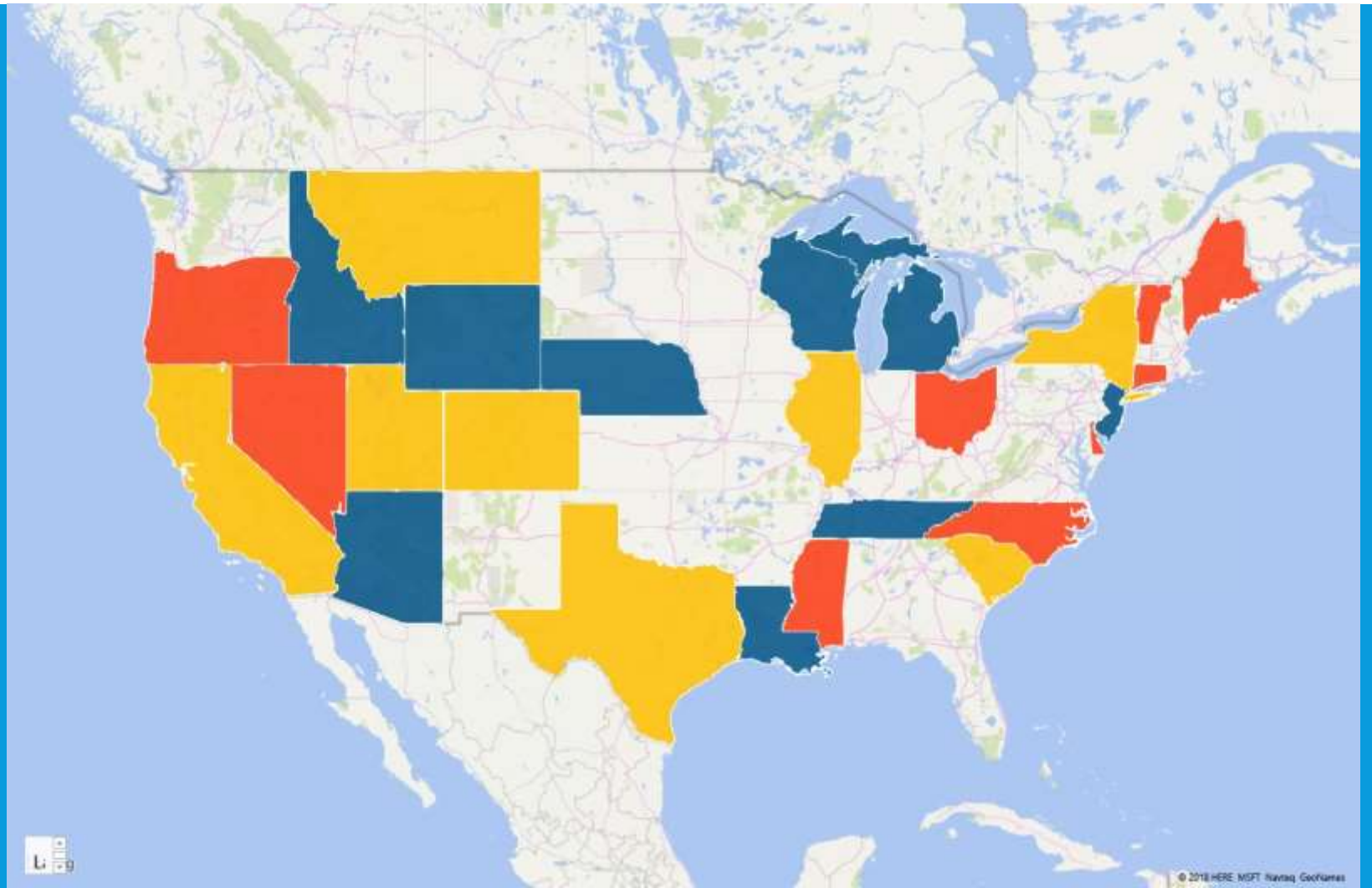
STATE OF THE MARKET – PT USERS



STATE OF THE MARKET – OTHER COTS SYSTEMS



STATE OF THE MARKET – PLUS THOSE STATES ACTIVELY PURSUING A NEW SYSTEM



AGENDA

- Survey results
- Business drivers for ROW software
- What to include in a ROW suite
- Future trends in ROW technology
- Lessons learned

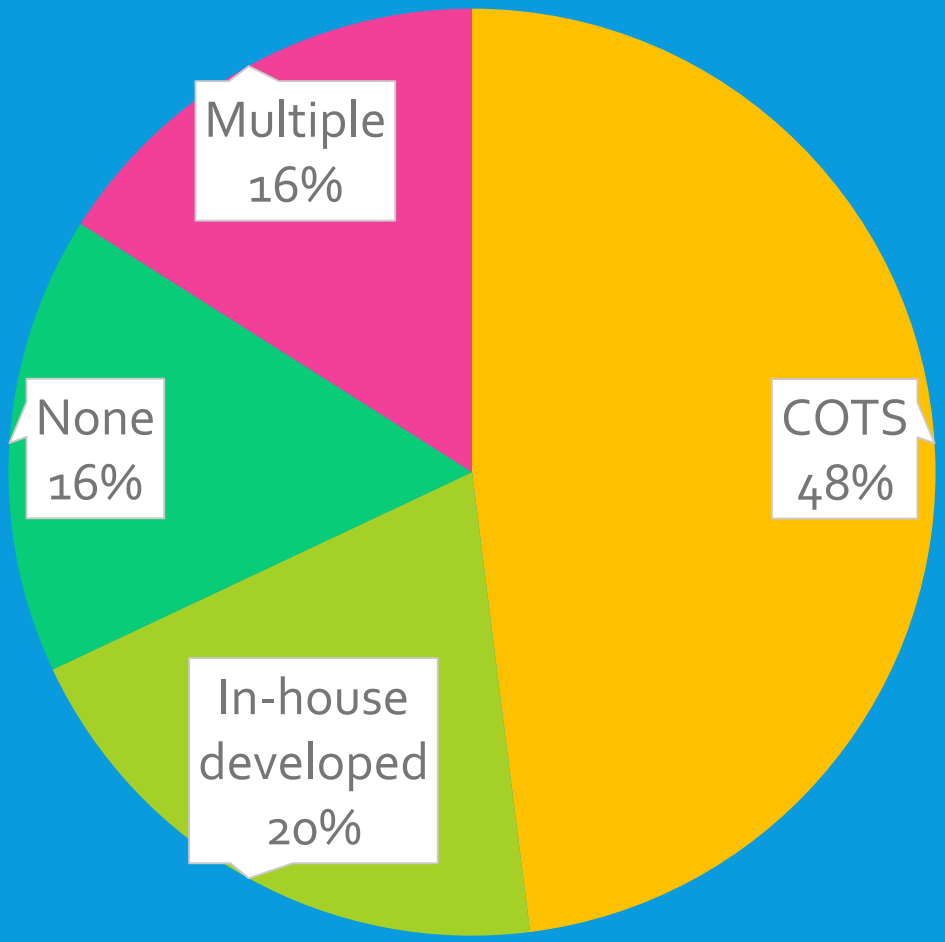
MARKET SURVEY OF STATE DOTs

- Recent research:
  - Caltrans DRISI August 2016 Right of Way Information Management Systems
  - FHWA July 2015 Implementation of Electronic Right-Of-Way Management Systems Versus Paper Systems
- Market survey
- Targeted 110 participants
- 46 DOTs
- 28 responses
- 15 questions

SURVEY QUESTIONS

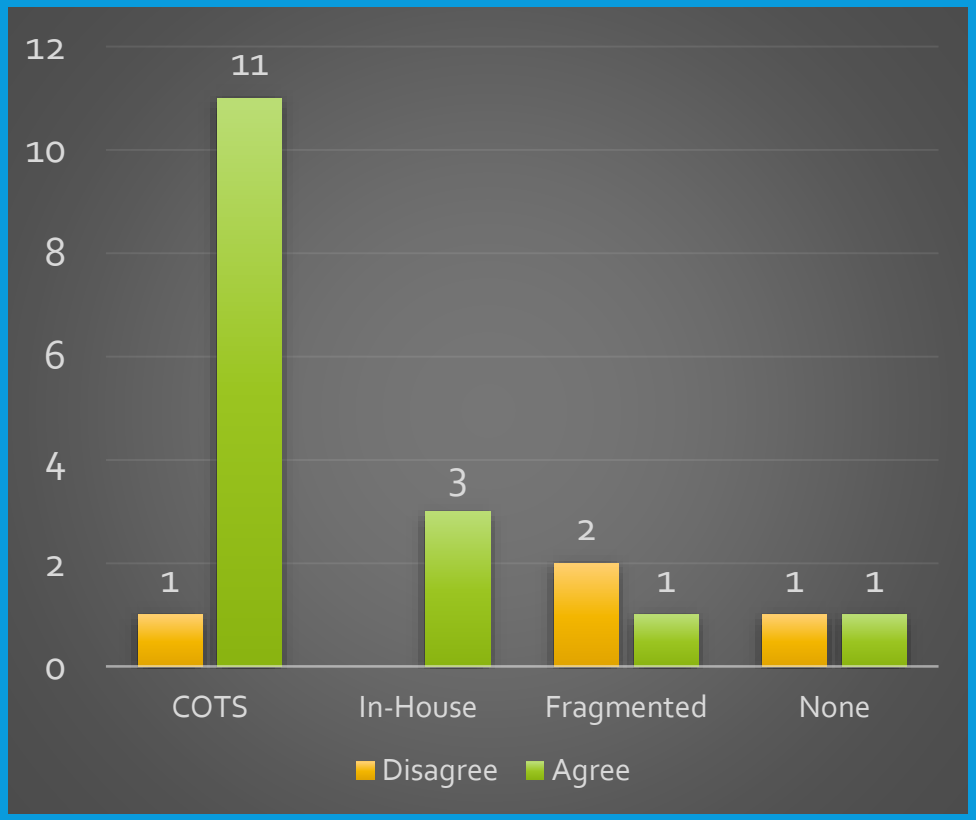
- Current system
- Business drivers
- User satisfaction
- System integration
- System implementation

TYPES OF AUTOMATED ROW SYSTEMS



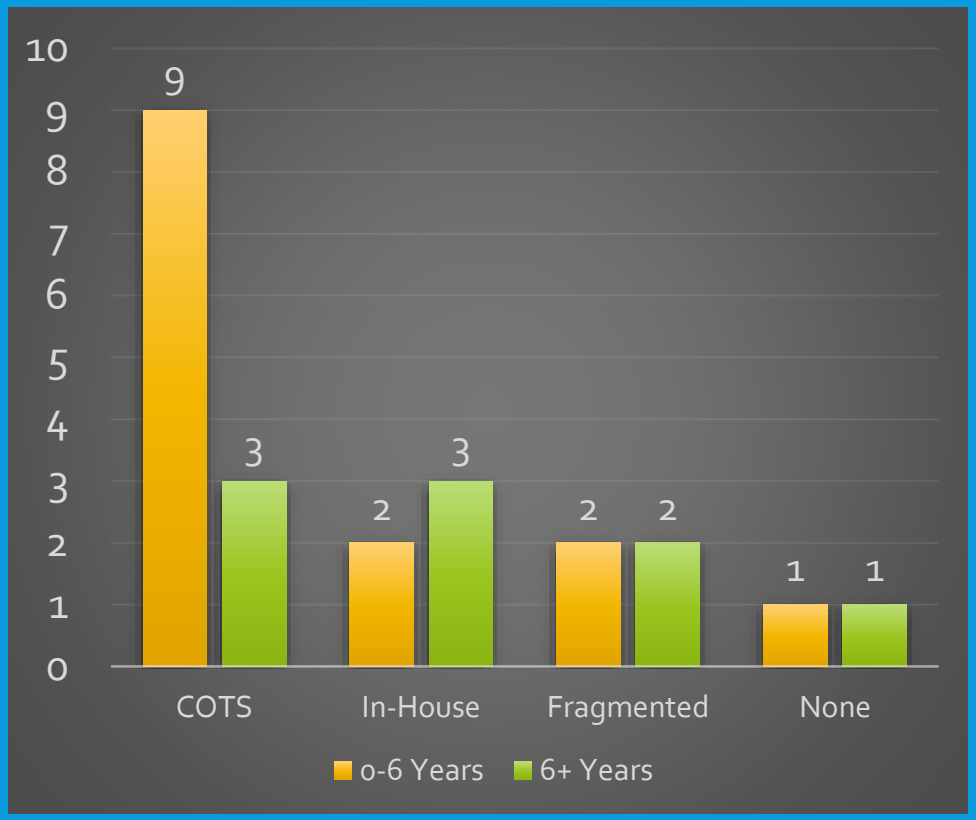
ERP – A DESIRE FOR STANDARDIZATION & SIMPLICITY

PRODUCTIVITY: COTS vs. NON-COTS



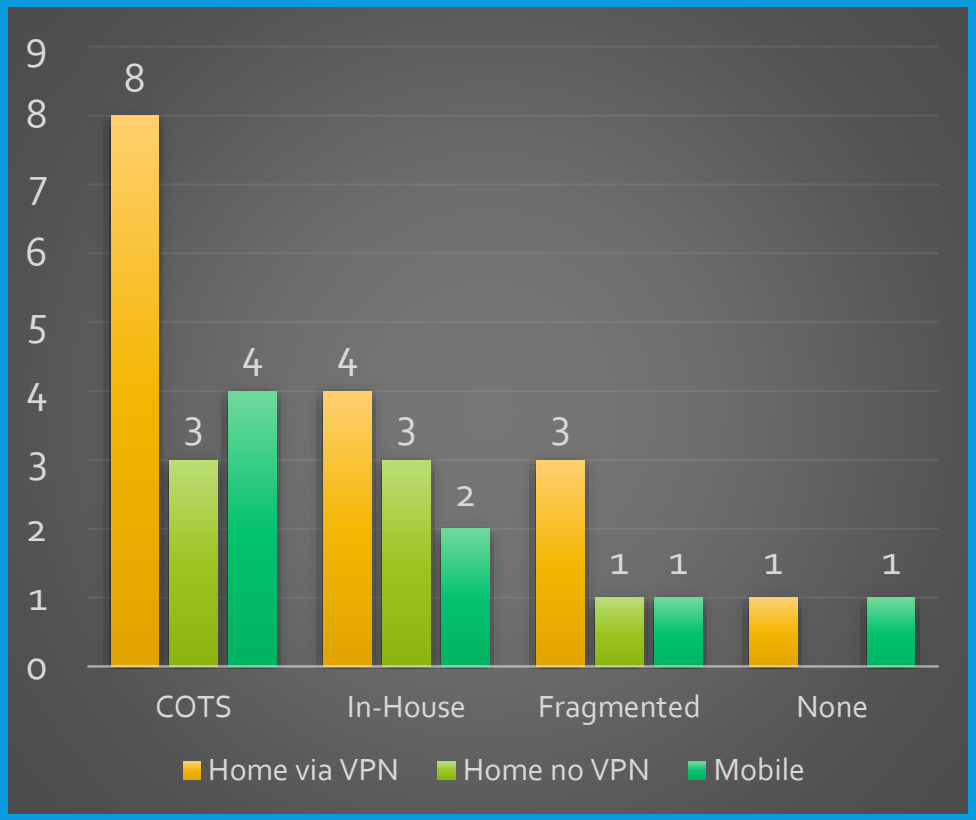
- **Participants agreed that COTS or in-house system increased their productivity**

USAGE DURATION: COTS vs. NON-COTS



- **COTS's system are in use longer**

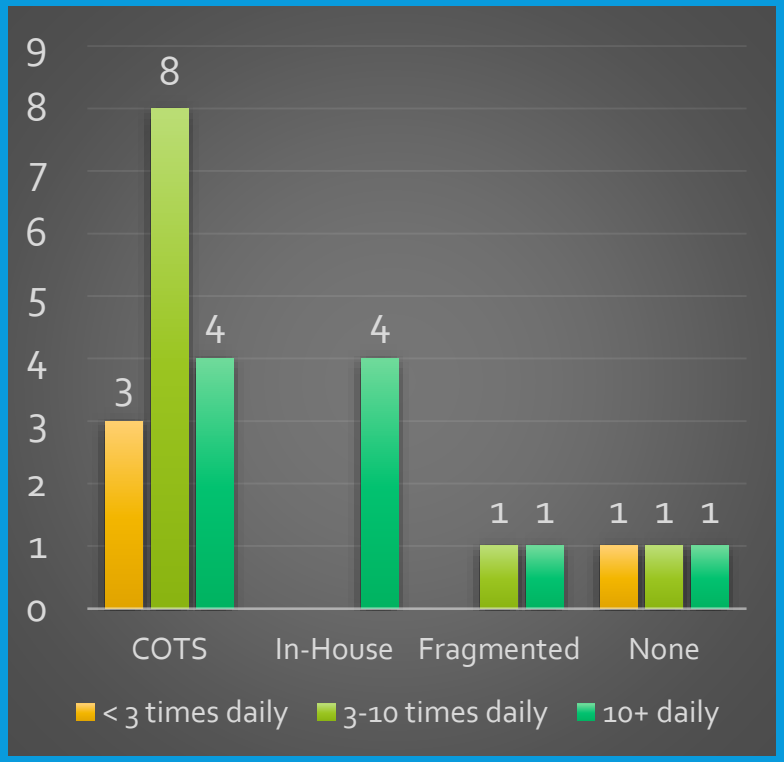
ACCESS: COTS vs. NON-COTS



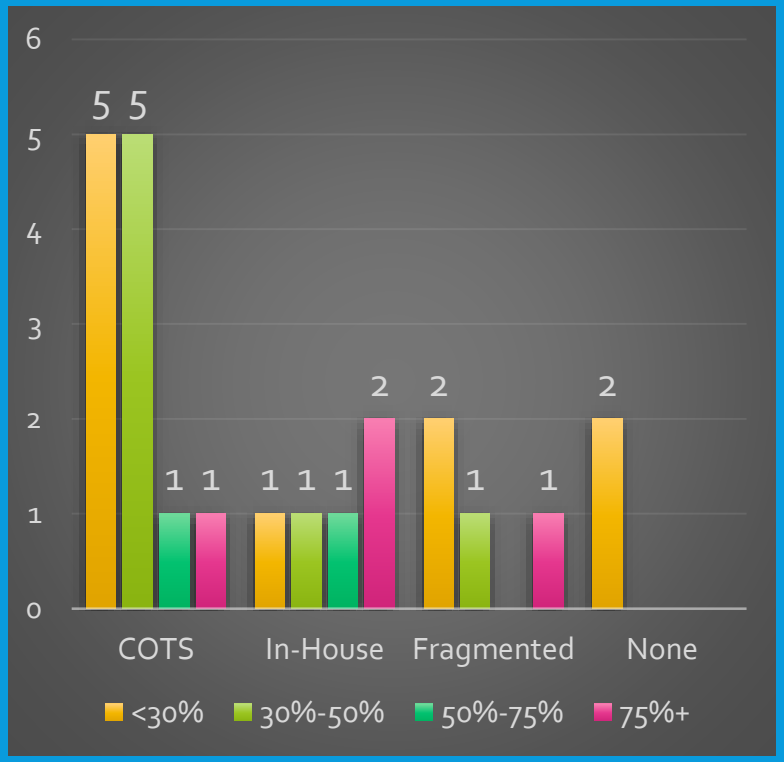
- **COTS and In-House has better access**

USAGE: COTS vs. NON-COTS

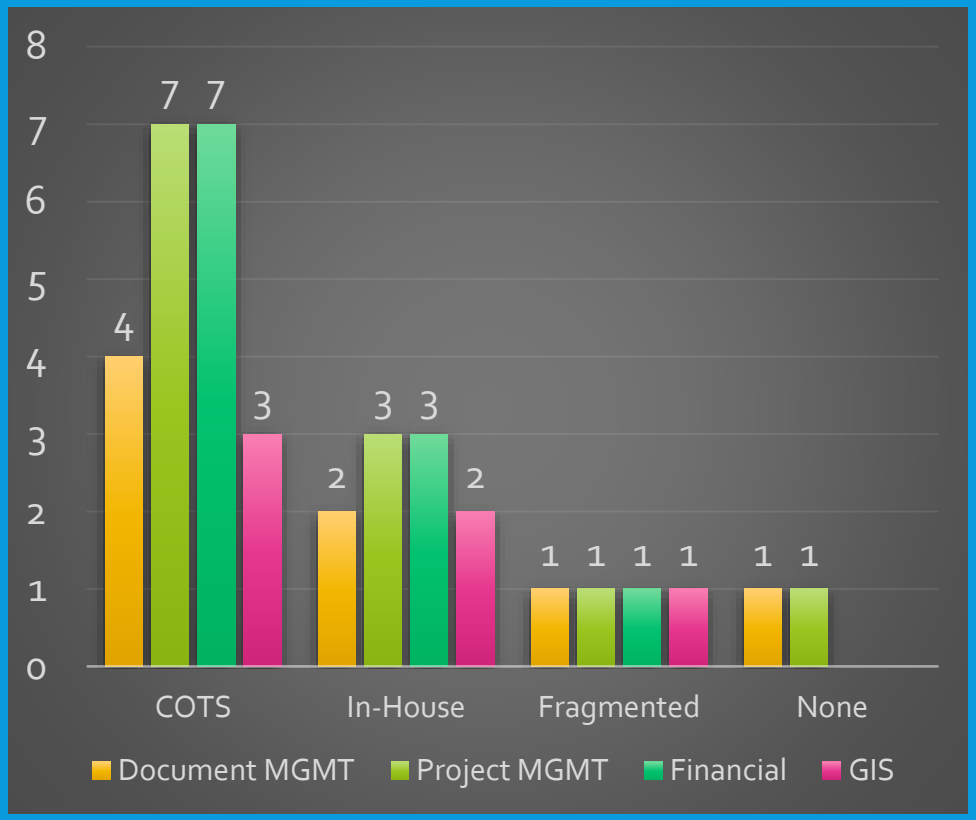
Frequency



Duration of use



INTERFACES: COTS vs. NON-COTS



- **COTS and in-house provides more integration opportunities**

FUNCTIONS/ BENEFITS

We asked about:

- **Reliability**
- **Integration**
- **Reporting**
- **Usability**
- **Modern UI**

- **Trends were more positive for:**
  - **COTS**
  - **In-house (but diminishing over time)**

BUSINESS DRIVERS

Then

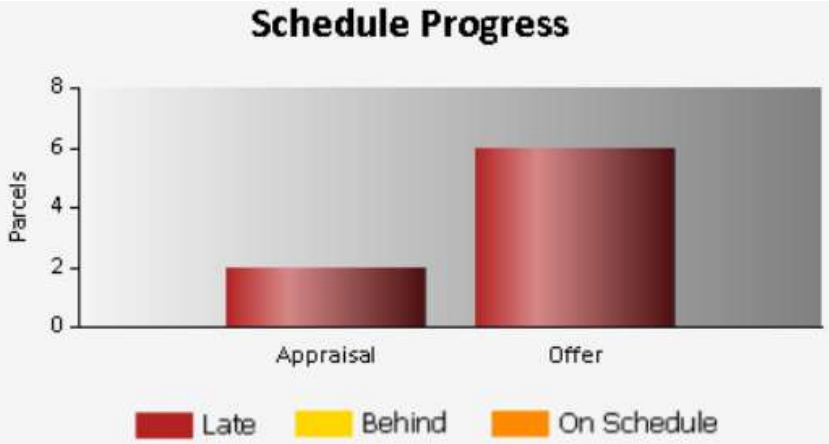
- Compliance
- Preservation of institutional knowledge
- Standardization of process
- Transparency
- Reporting

Now

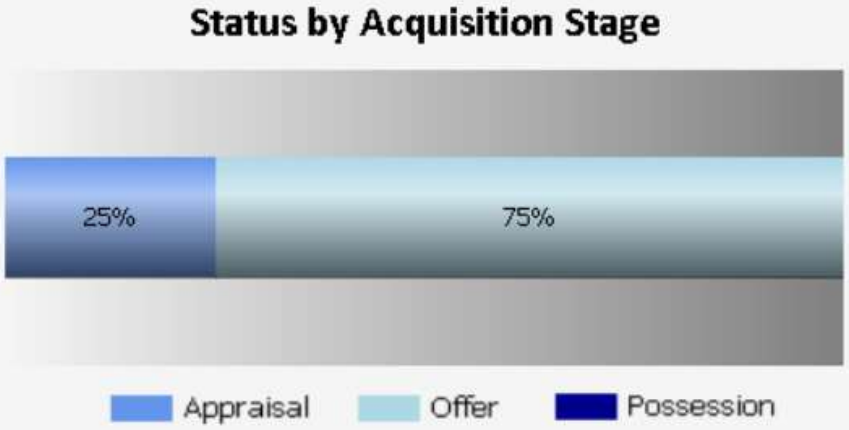
- KPIs
- GIS
- Mobile
- External access/ use

BUSINESS DRIVERS – KPIs

Schedule	Appraisal	Offer	Possession	Total
Late	2	6	0	8
Total	2	6	0	**8**



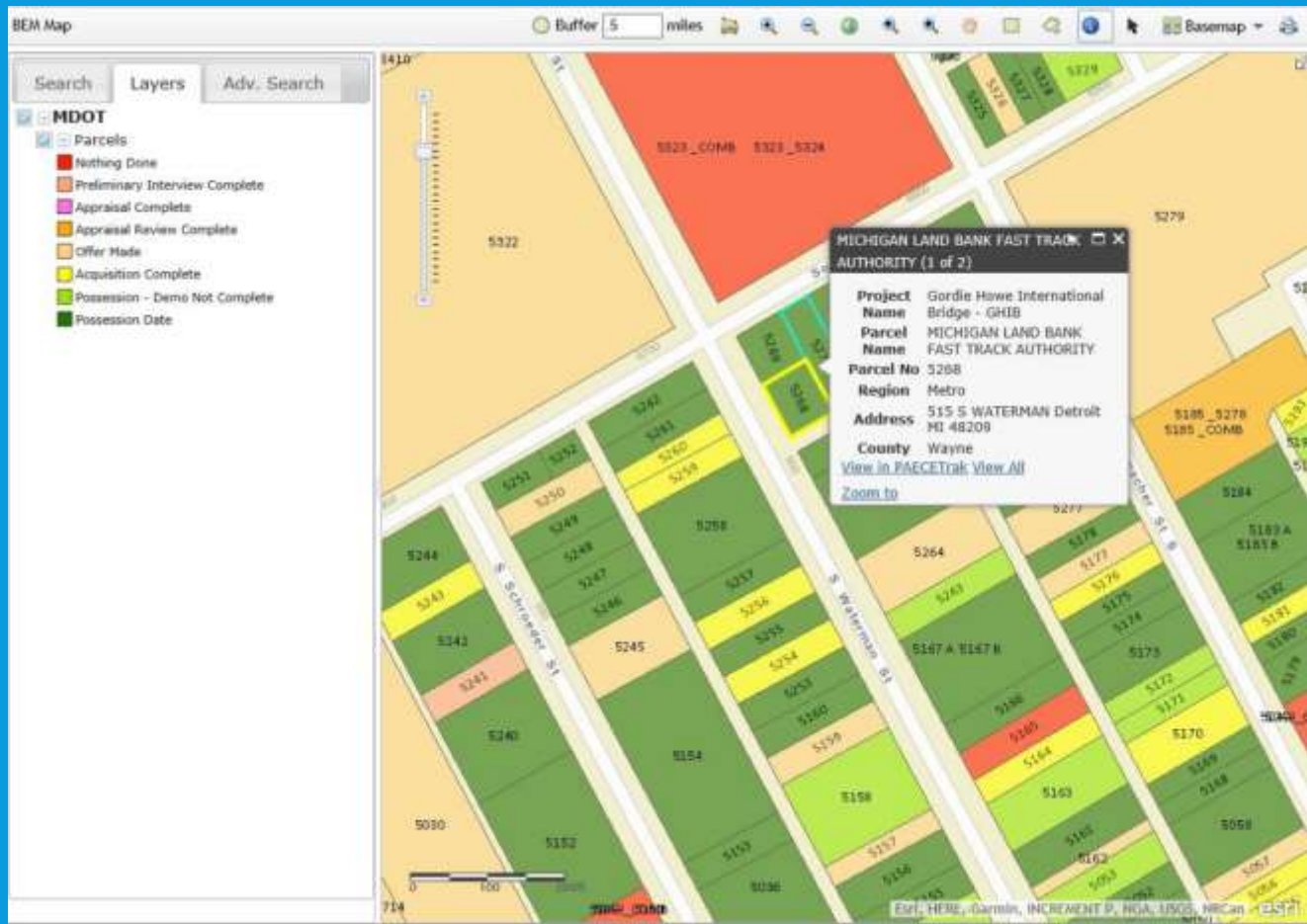
Design Unit/Contract	Appraisal	Offer	Possession	Total
Cnty Yard	2	6	0	8
Total	2	6	0	**8**



BUSINESS DRIVERS – KPIs

GIS

- Engineering drawing importing
- Buffer analysis



MOBILE

- Data access
- eSignatures
- Field inspections
- Geotagging images

EXTERNAL ACCESS/ USE

- Portals:
  - Highway access permitting
  - Outdoor advertising
  - Payment processing
  - Consultant access

DRISI REPORT

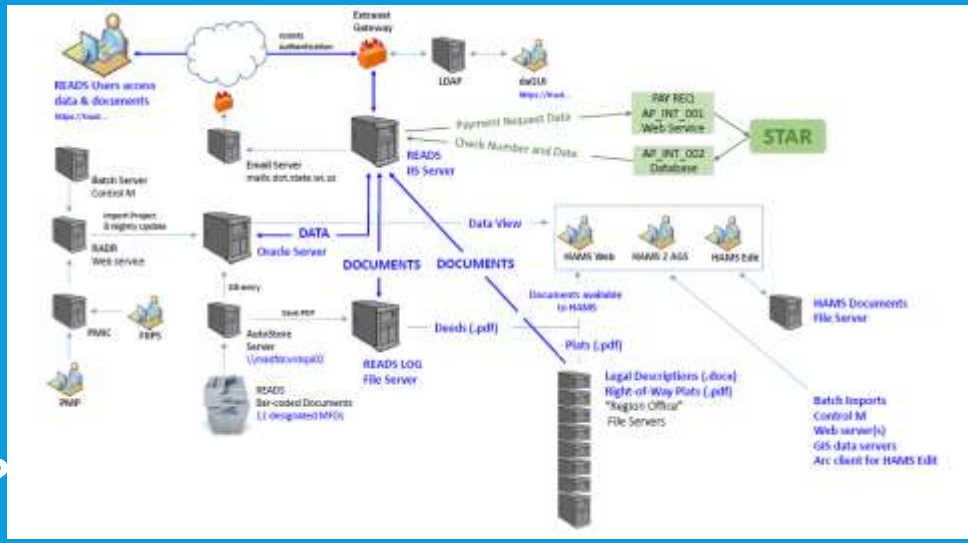
- No two DOTs are the same
- Clarity on core capability

Business Processes or Functions	Alabama	Alaska	California HSRA	Missouri	Ohio	Oregon	Pennsylvania	South Carolina	Utah	Vermont	Wisconsin
Acquisition/condemnation	x	x	x	x	x	x	x	x	x	x	x
Airspace leases				x		x				x	x
Appraisals	x		x	x	x	x	x	x	x		x
Capital and support costs						x					
Clearance and demolition				x		x	x				x
Estimating			x	x	x	x		x	x		x
Excess lands	x		x	x	x	x	x		x	x	x
GIS			x	x		x				x	x
Local assistance projects					x	x		x	x	x	x
Mitigation				x	x	x				x	
Project certification		x	x	x	x	x	x	x	x	x	
Project coordination	x		x		x	x			x		
Property management	x	x	x	x	x	x	x		x	x	x
Railroad payments			x	x		x					
Real estate leases			x	x		x	x			x	x
Relocation assistance	x		x	x	x	x	x	x	x		x
Report generation (custom)	x		x	x	x	x	x	x	x	x	x
Report generation (standard)			x	x	x	x		x	x	x	x
ROW engineering			x			x					
Utility relocation					x			x		x	
Number of Processes or Functions Supported	7	3	14	15	13	19	9	9	11	12	13

Source: Caltrans Division of Research, Innovation and System information report on Right of Way Information Management Systems

WHAT TO INCLUDE

- Customer portal?
- GIS?
- Mobile?
- Project management?
- eSignature?
- Document management?
- Financial information system?
- Consultant access?
- Data analytics?



FUTURE OF TECH IN ROW

- Analytics
- Big Data vs Machine learning
- 360 Stereoscopic video, VR, and AR

ANALYTICS

Descriptive

- Summarize the past
- Majority of analytics are descriptive

Predictive

- Forecast what *might* happen
- Uses a variety of statistical models
  - Linear regression
  - Logistic regression

ANALYTICS

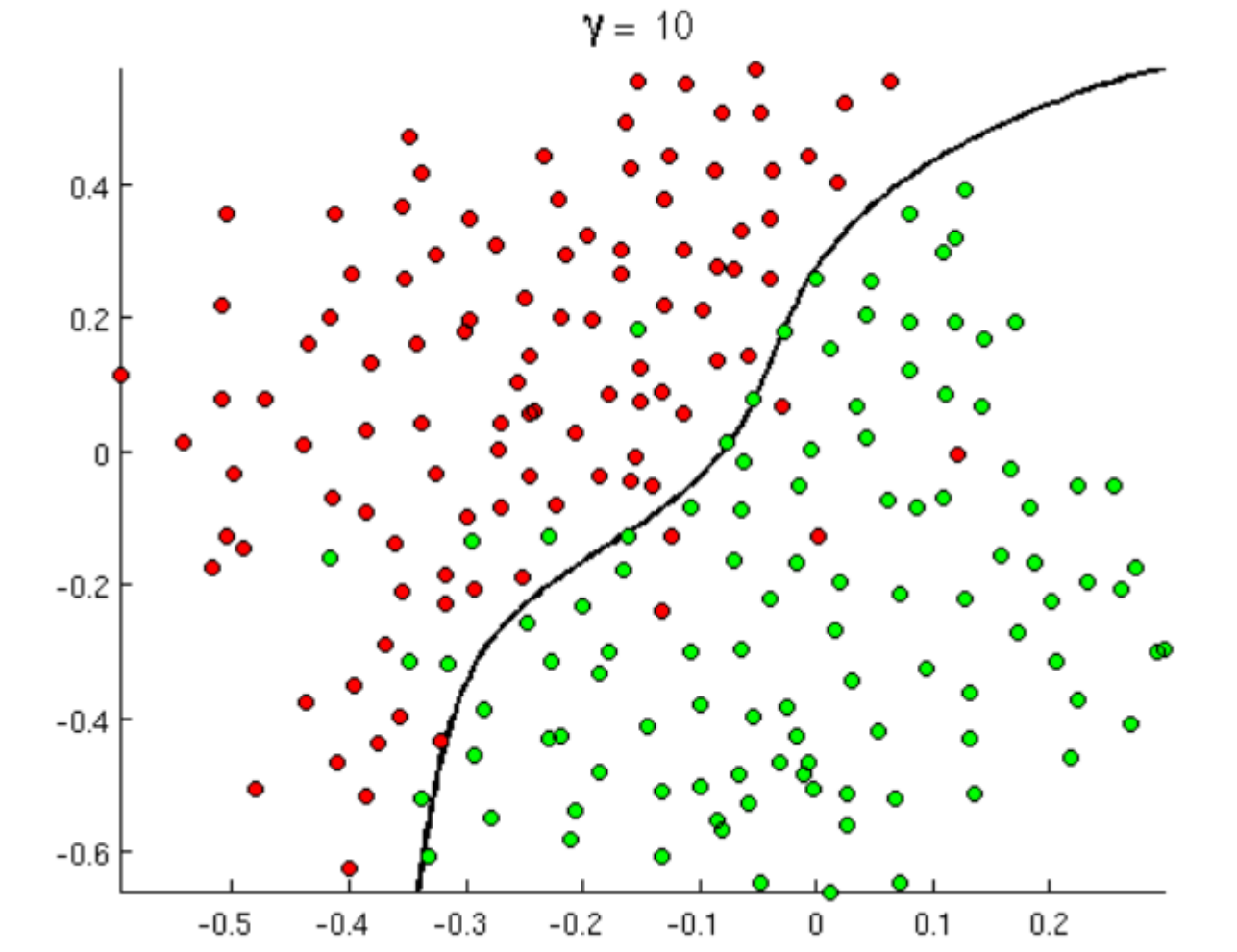
Big Data

- 3Vs
  - Volume
  - Variety
  - Velocity

Machine learning

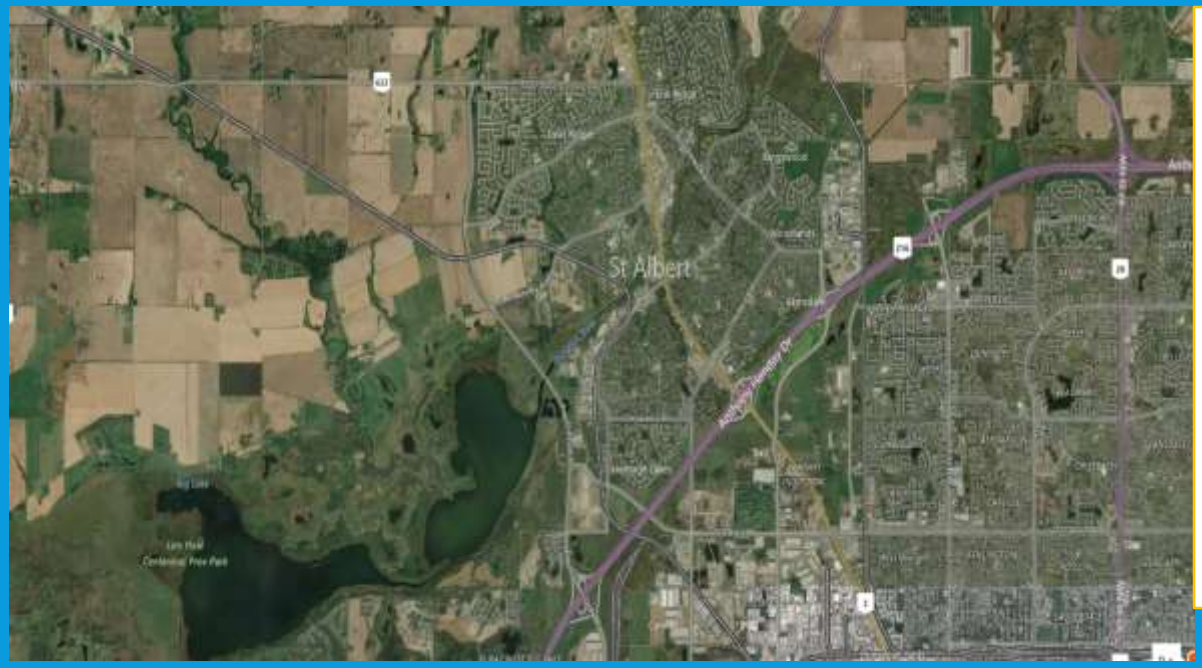
- Offers insight into data, finds hidden patterns
- Classification
  - Supervised
  - Unsupervised

MACHINE LEARNING VISUALIZED



PUTTING IT ALL TOGETHER

- Analytics
  - Descriptive
  - Predictive
- Big data and machine learning



Distance: 3.9 miles
Land types:
56% residential
34% commercial
10% other

Forecasts:
88% acquisition
11% condemnation
$14.5 acquisition cost
$2.3 million relocation cost
3.2-4.1 years

360 STEREOSCOPIC VIDEO

Video can be found at https://www.youtube.com/watch?v=PbhdSmjIOnE

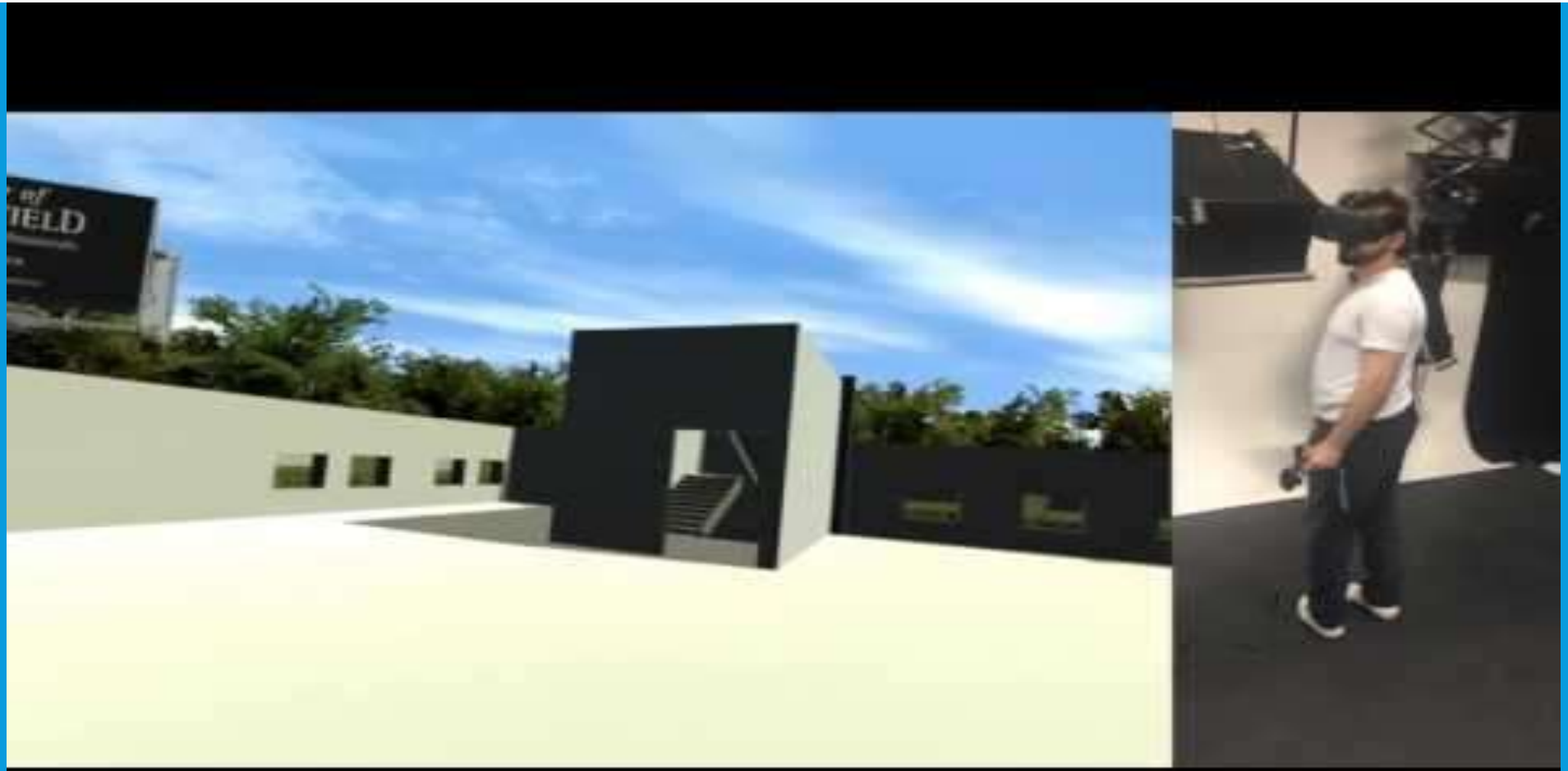
VIRTUAL REALITY

Video can be found at = https://www.youtube.com/watch?v=mtobPt9f51k

VIRTUAL REALITY

THIS IS VIRTUAL REALITY!

Video can be found at = https://www.youtube.com/watch?v=86UQoi5MPOA



AUGMENTED REALITY

Video can be found at = https://www.youtube.com/watch?v=nFSAxMKHNMY

LESSONS LEARNED

1. Be clear on business objectives and why you are doing this
2. Do not develop internally
3. Strong project management
4. "Go Live" on schedule – do not make the good the victim of the perfect
5. Manage Milestones
6. Own your data
7. Change Management
8. Budget for enhancements for first two years after go live

and last but not least……

OUR BEST ADVICE ON HOW TO SELECT A SYSTEM

First, hire based on qualifications/ track record

Second, then negotiate requirements task that produces a detailed roadmap, requirements document with costs and work breakdown structure

Third, negotiate separately the implementation and training with payment milestones.

“We didn’t just buy a technology, we hired a company. A primary objective of our team was to select a well-established vendor with excellent references, qualifications and a reputation for superior customer service. We viewed this effort not as buying a product but rather as entering into a long term mutually beneficial partnership.”

- **Drew Kottke, Project Manager**
- **Wisconsin Department of Transportation**

QUESTIONS?

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President & CEO

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Jason Rappaport

Software Product Manager

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908.598.2600, ext. 136

RESOURCES

ROW Software Vendors:

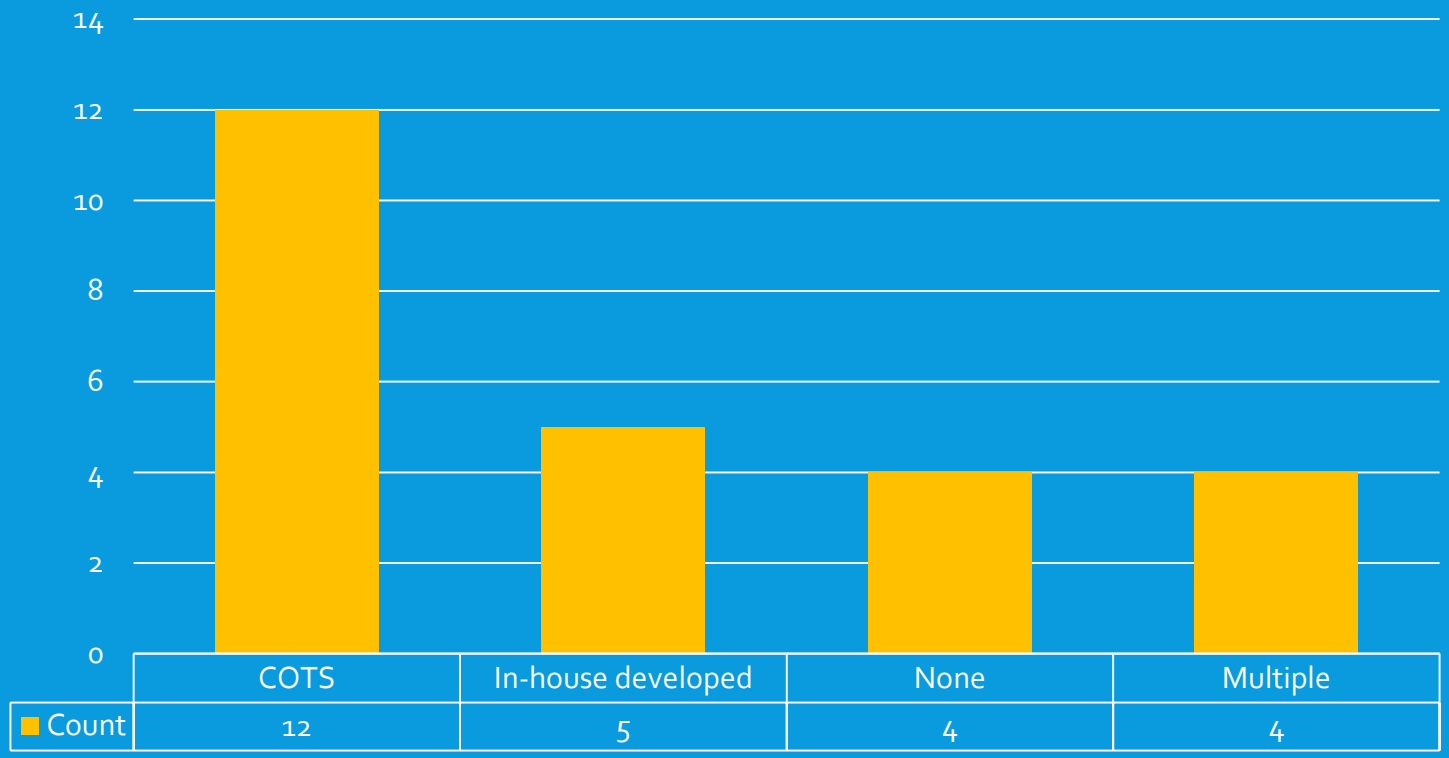
- **BEM Systems http://bemsys.com 908.598.2600**
- **Flairdocs http://flairdocs.com 614.519.8734**
- **GeoAMPS http://geoamps.com 614.389.4871**

Recent research:

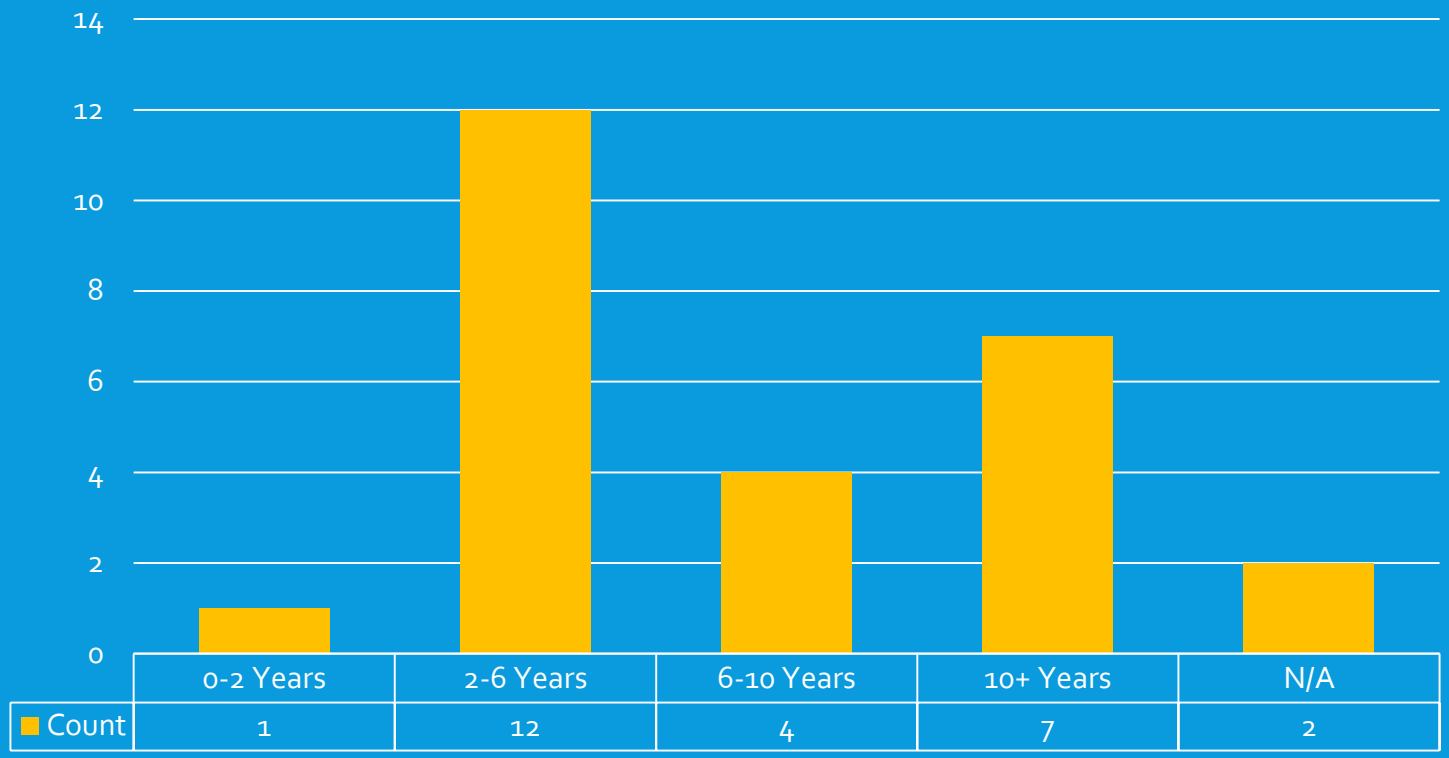
- **Caltrans DRISI Right of Way Information Management Systems, 8.2016 https://goo.gl/PmqVw6**
- **FHWA Implementation of Electronic Right-Of-Way Management Systems Versus Paper Systems, 7.2015 https://goo.gl/C5sXkc**

APPENDIX – SURVEY RESULTS

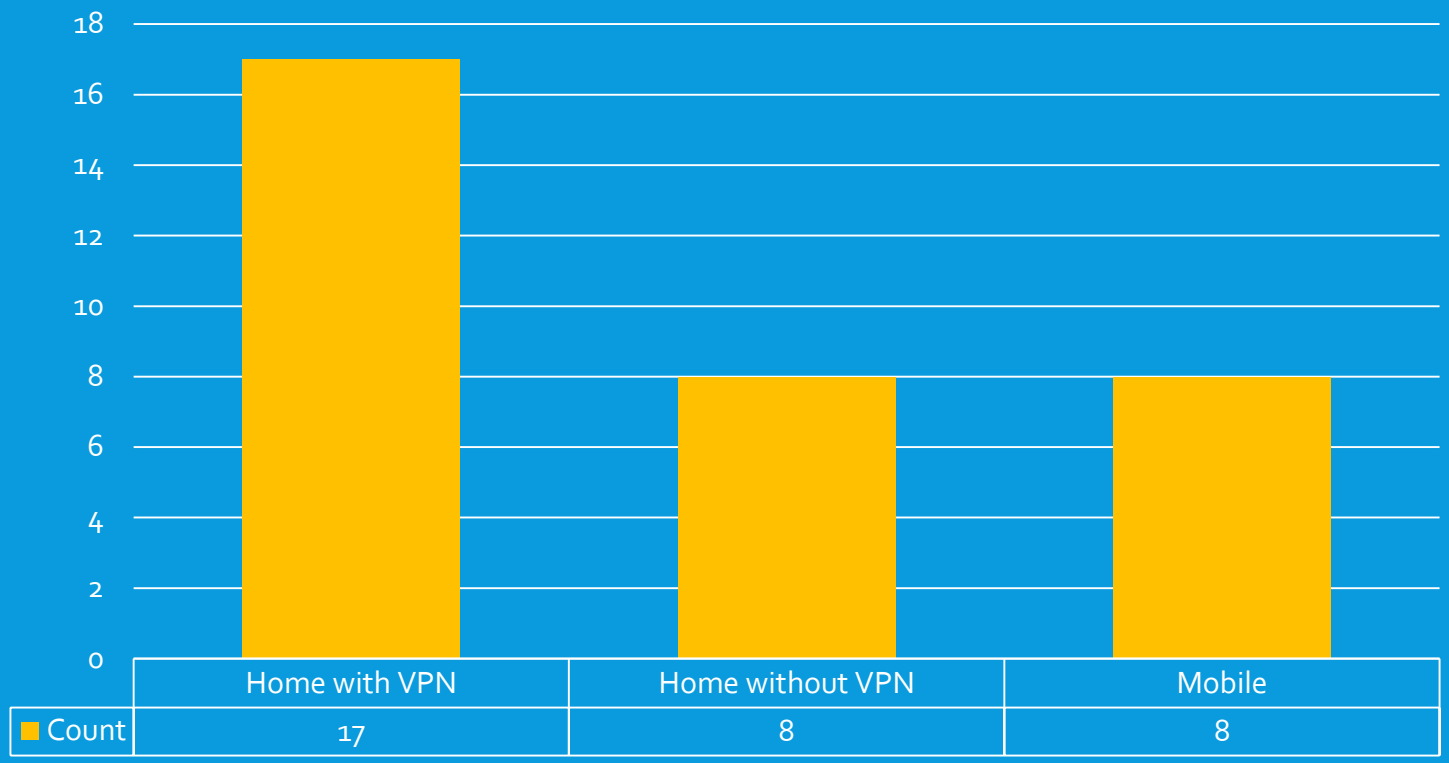
WHAT TYPE OF ROW SYSTEM DO YOU HAVE?



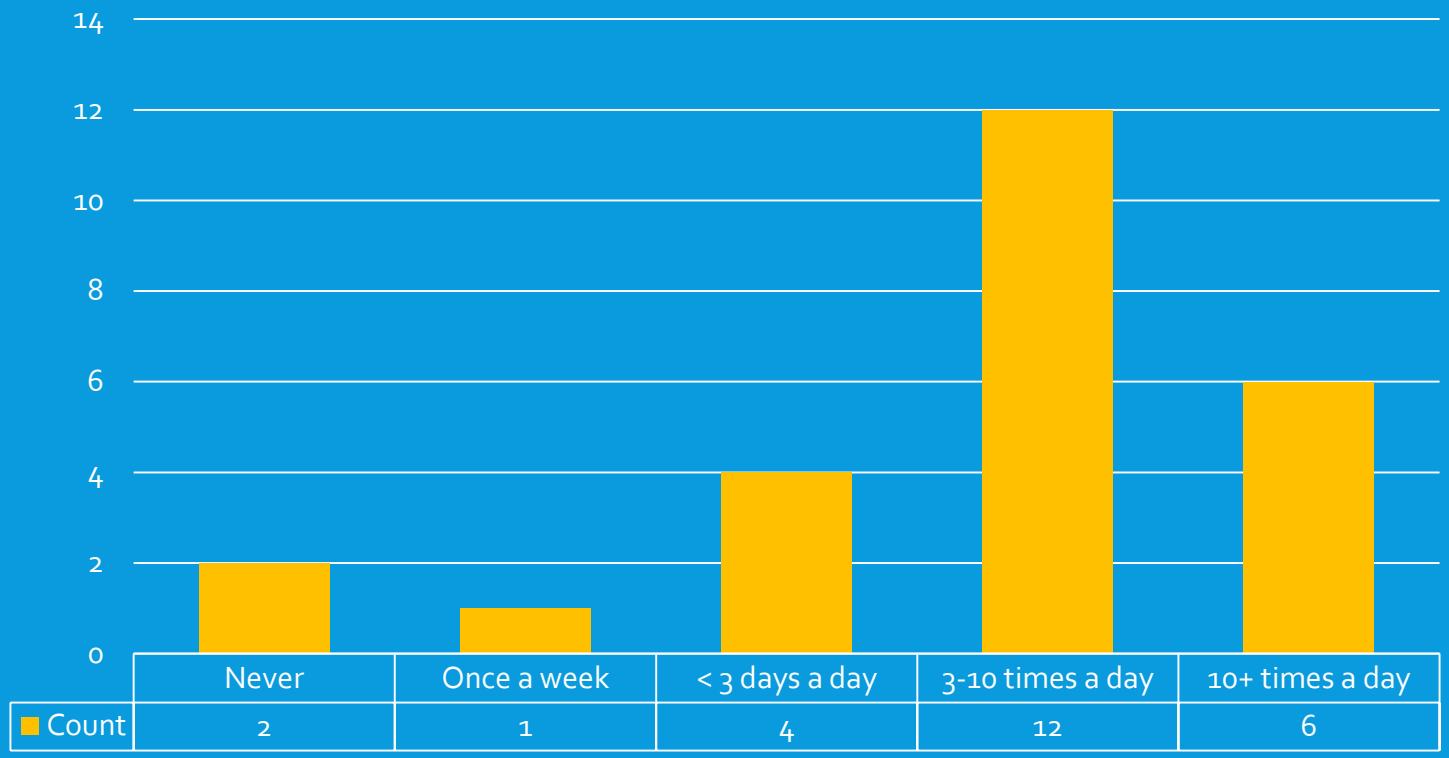
HOW LONG HAS YOUR CURRENT ROW SOFTWARE BEEN IN PLACE?



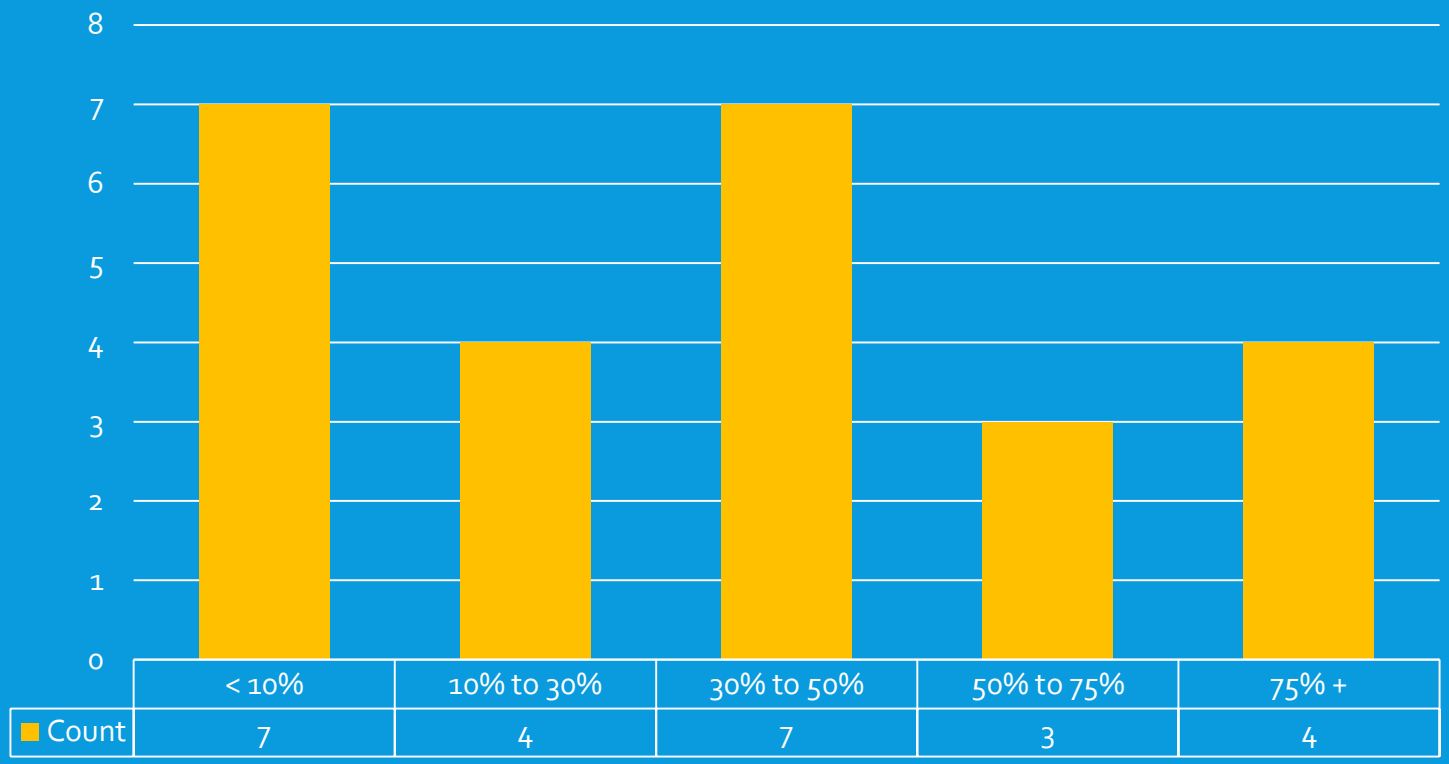
HOW CAN YOU ACCESS YOUR ROW SOFTWARE?



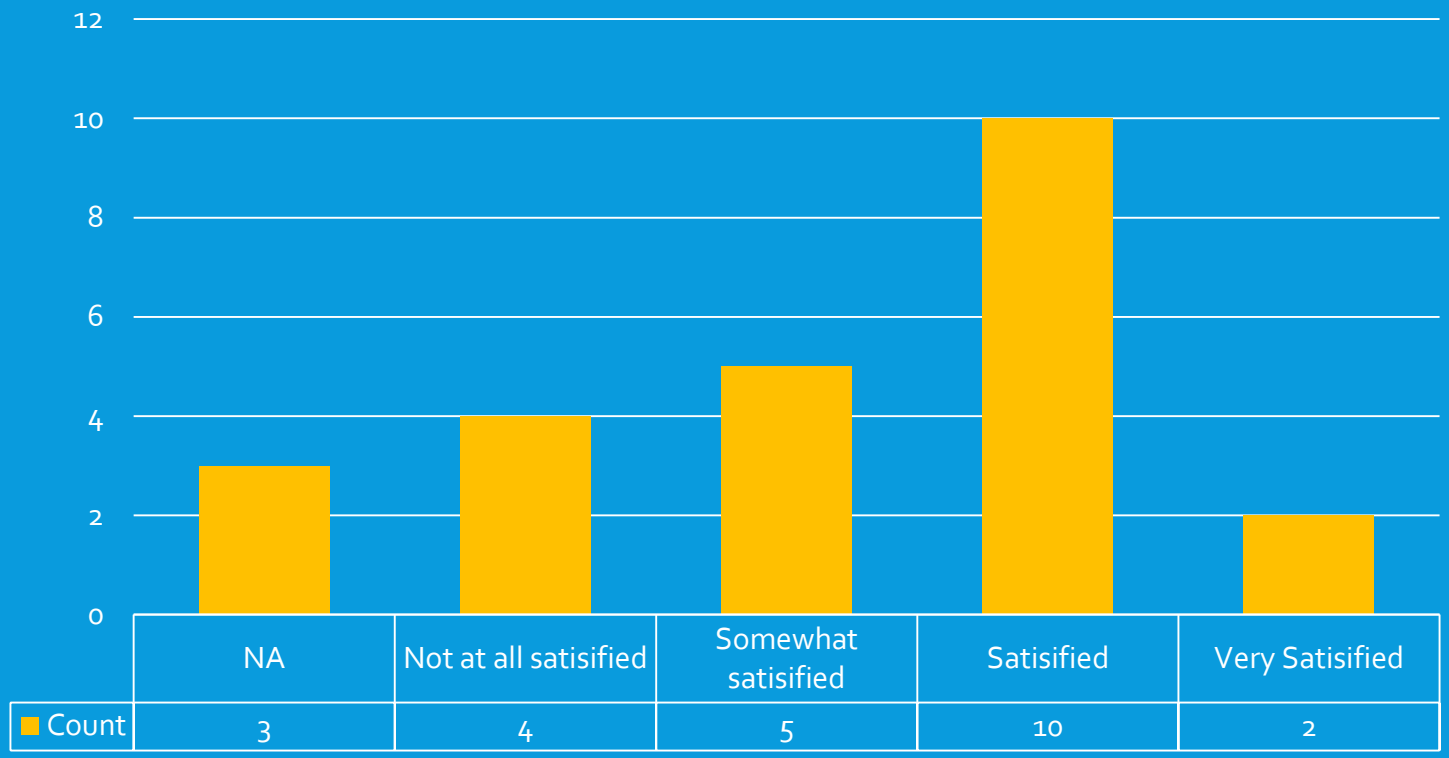
COUNT OF HOW OFTEN DO YOU ACCESS (FREQUENCY) THE ROW SOFTWARE?



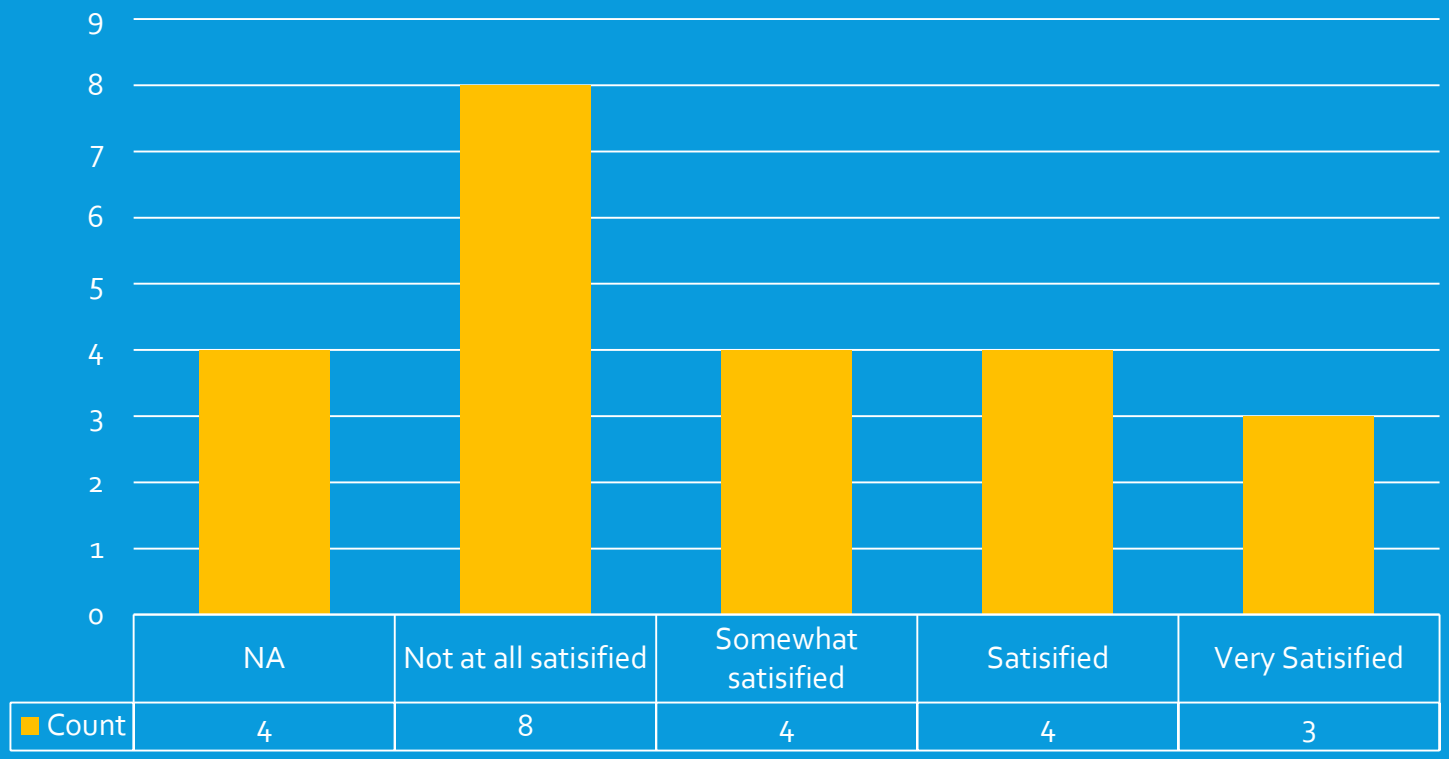
COUNT OF FOR WHAT PORTION OF YOUR WORKDAY DO YOU USE THE ROW SOFTWARE?



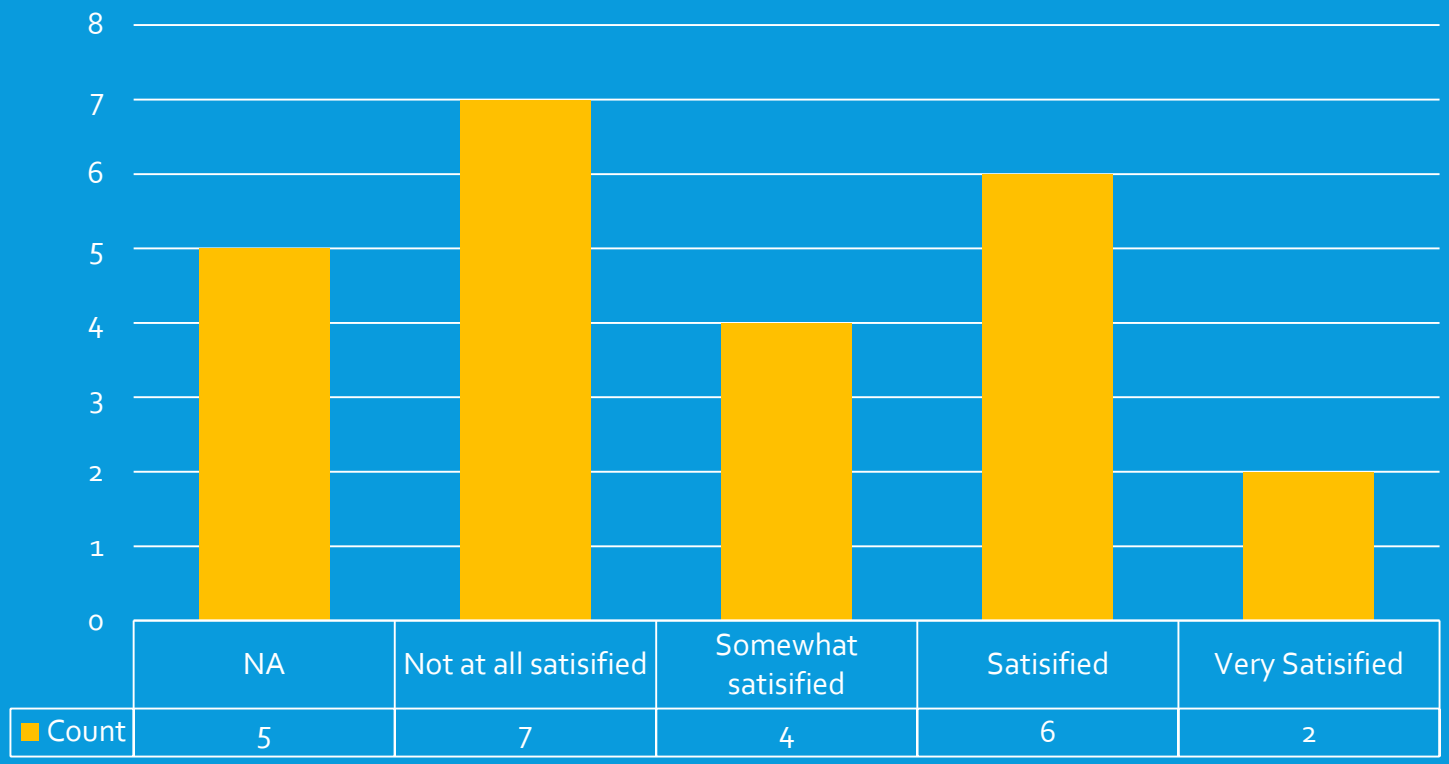
COUNT OF HOW SATISFIED ARE YOU WITH YOUR CURRENT ROW SOFTWARE AS IT PERTAINS TO: [RELIABILITY (CONSISTENT PERFORMANCE)]



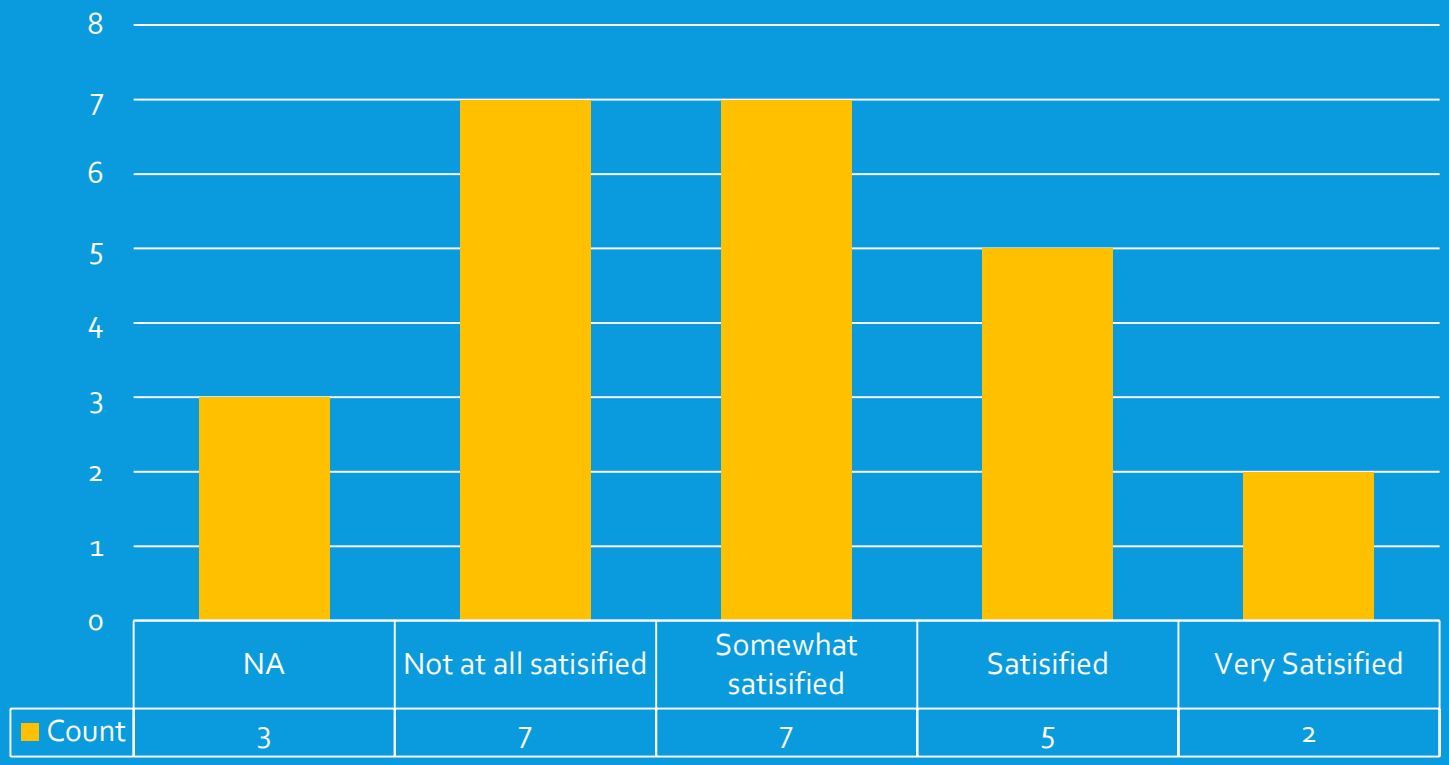
COUNT OF HOW SATISFIED ARE YOU WITH YOUR CURRENT ROW SOFTWARE AS IT PERTAINS TO: [ABILITY TO INTEGRATE OTHER SOFTWARE]



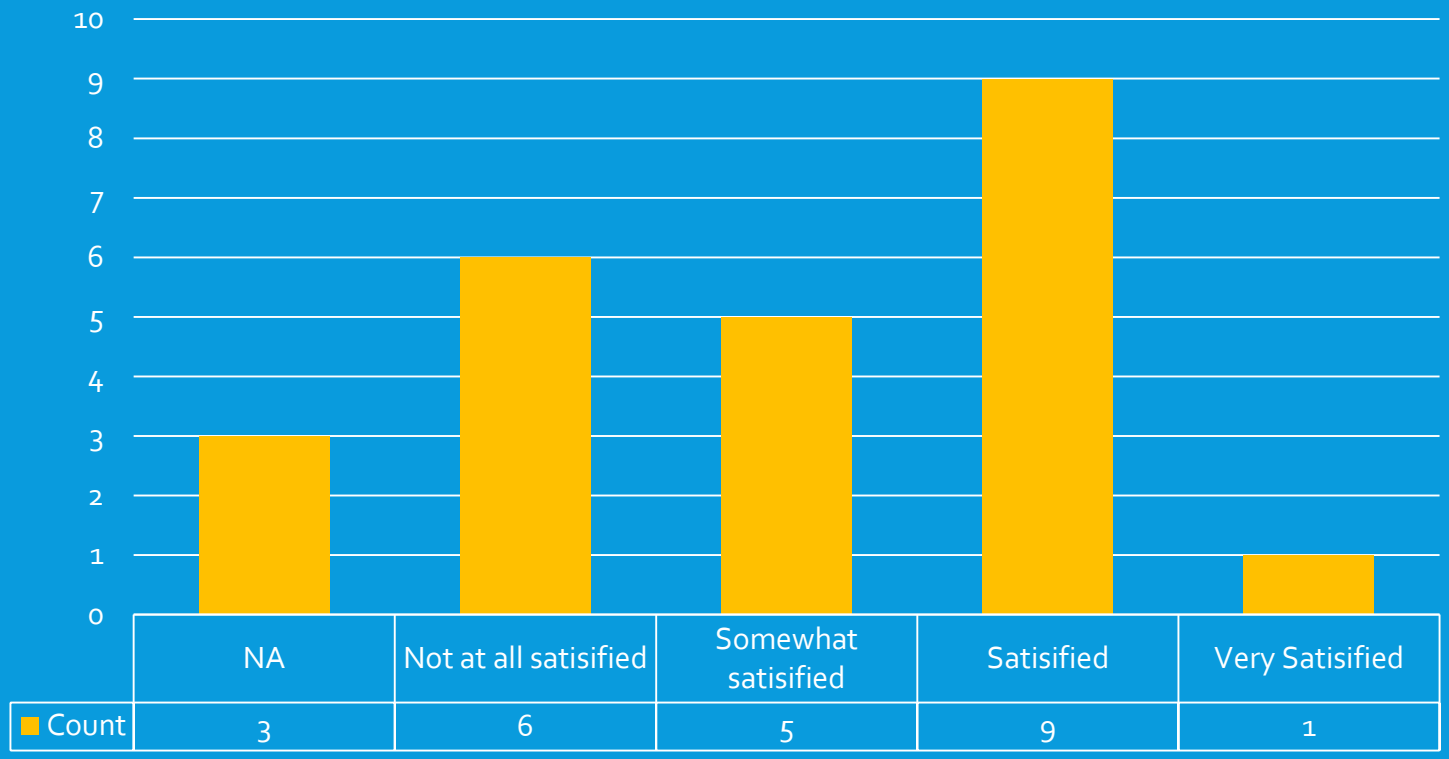
COUNT OF HOW SATISFIED ARE YOU WITH YOUR CURRENT ROW SOFTWARE AS IT PERTAINS TO: [ABILITY TO CREATE AD-HOC REPORTS]



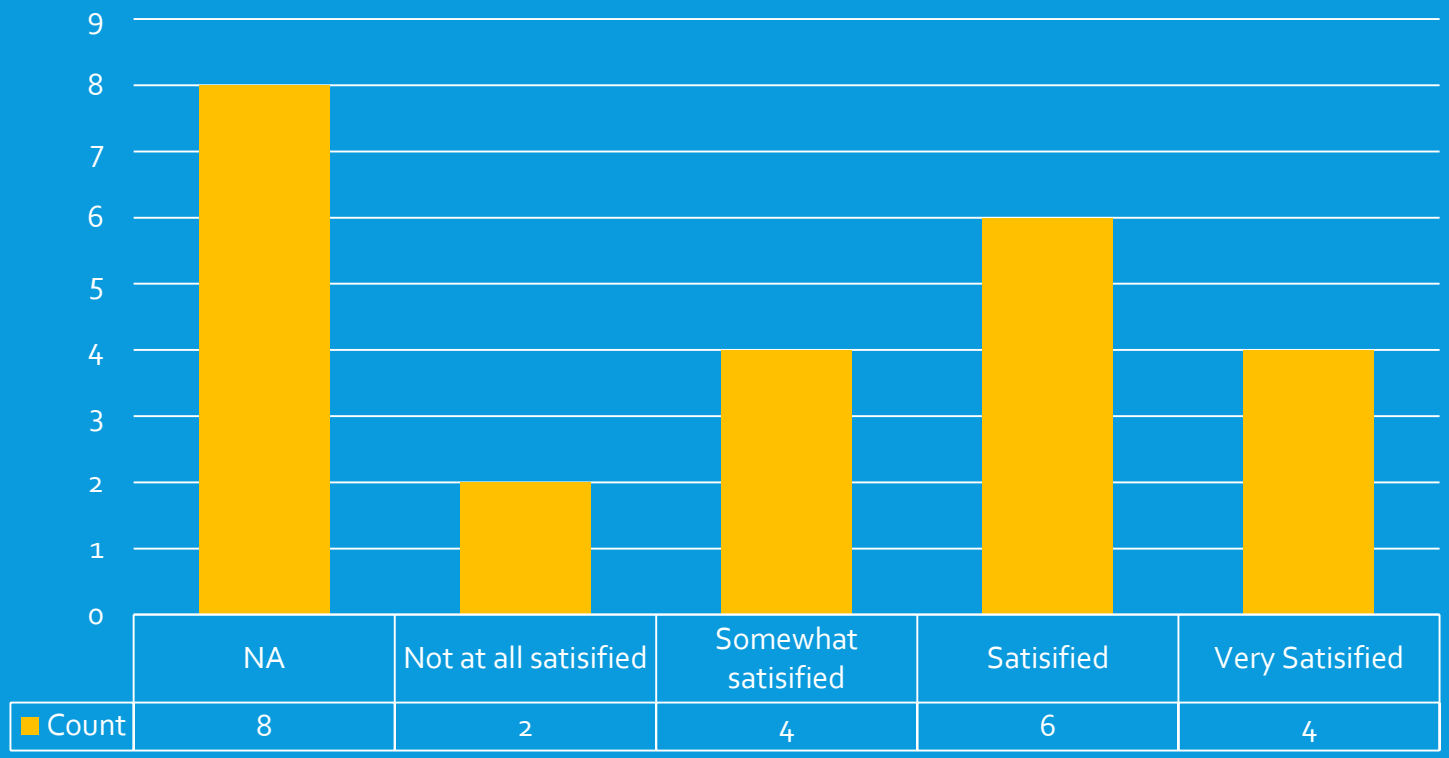
COUNT OF HOW SATISFIED ARE YOU WITH YOUR CURRENT ROW SOFTWARE AS IT PERTAINS TO: [USABILITY (BUTTON/ FUNCTION LAYOUT, GENERAL USER EXPERIENCE)]



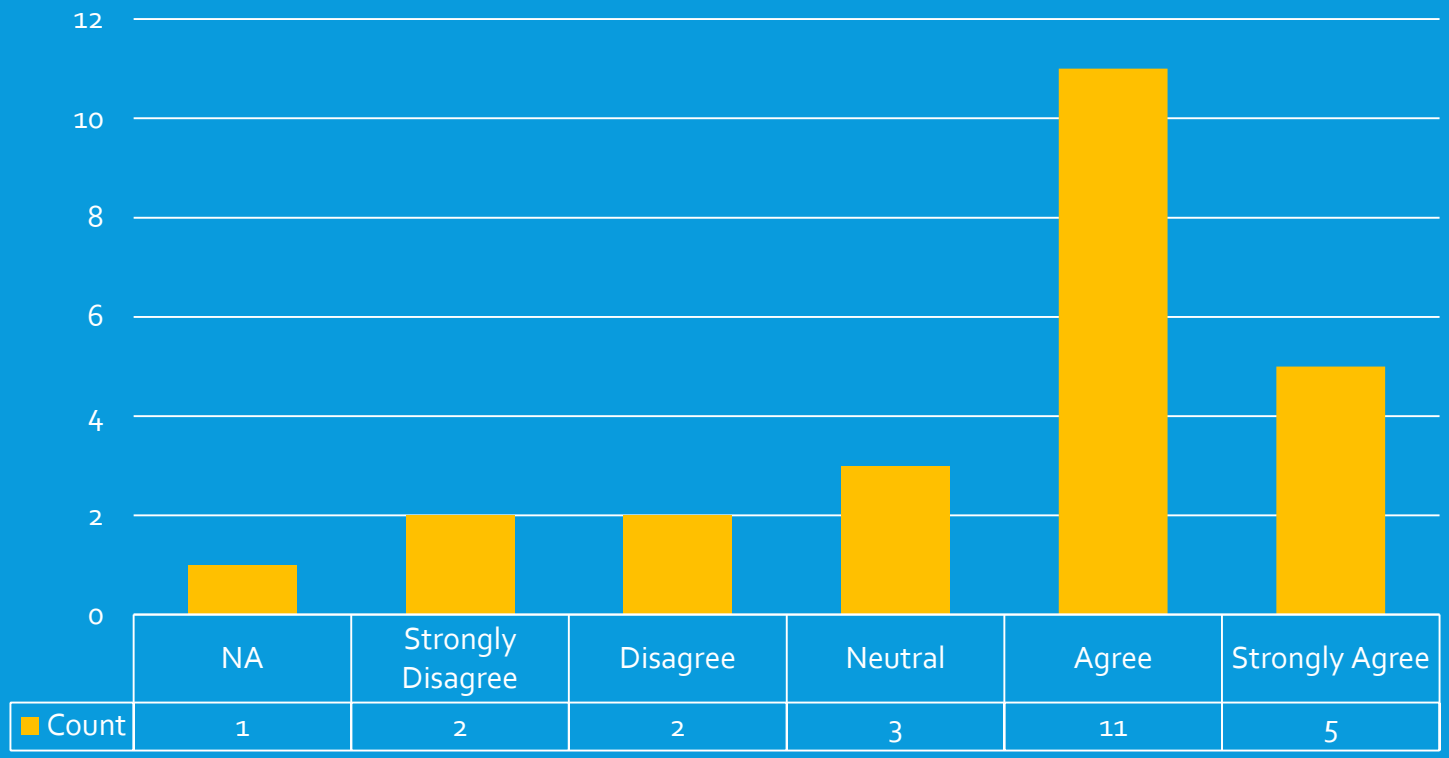
COUNT OF HOW SATISFIED ARE YOU WITH YOUR CURRENT ROW SOFTWARE AS IT PERTAINS TO: [USER INTERFACE (MODERN LOOKING APPLICATION)]



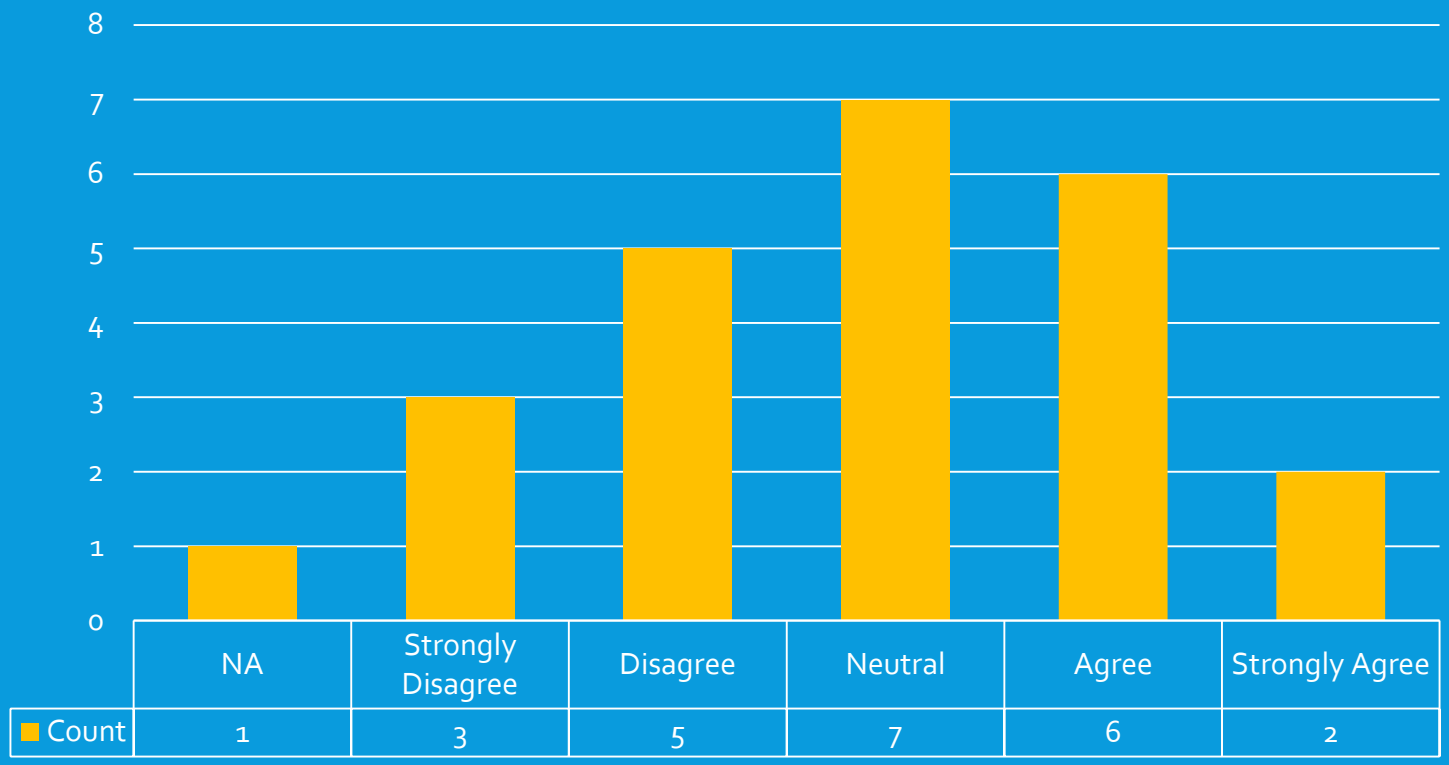
COUNT OF HOW SATISFIED ARE YOU WITH YOUR CURRENT ROW SOFTWARE AS IT PERTAINS TO: [SUPPORT PROVIDED]



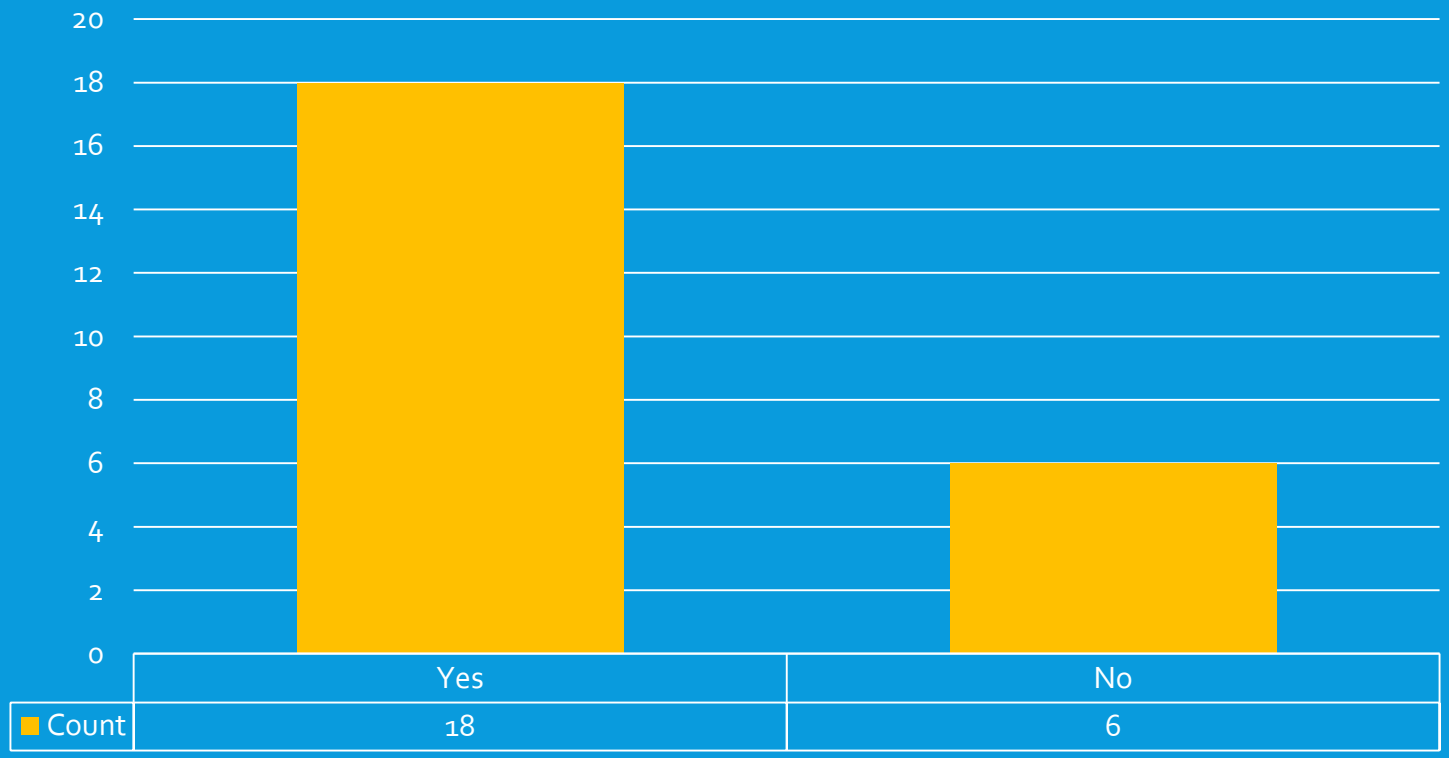
COUNT OF DOES YOUR CURRENT ROW SOFTWARE: [MAKE YOUR JOB EASIER]



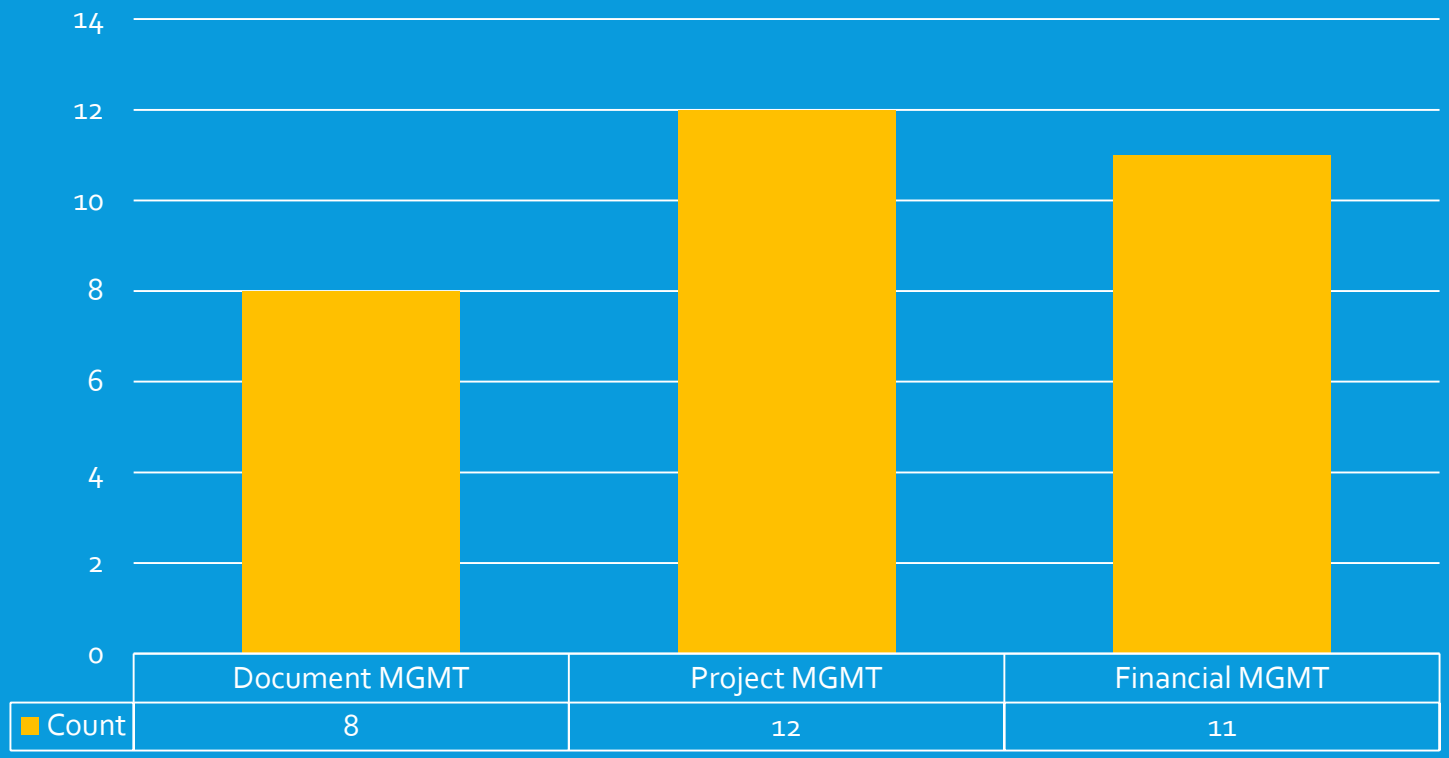
COUNT OF DOES YOUR CURRENT ROW SOFTWARE: [PROVIDE AN ENJOYABLE EXPERIENCE (DO YOU ENJOY USING IT)]



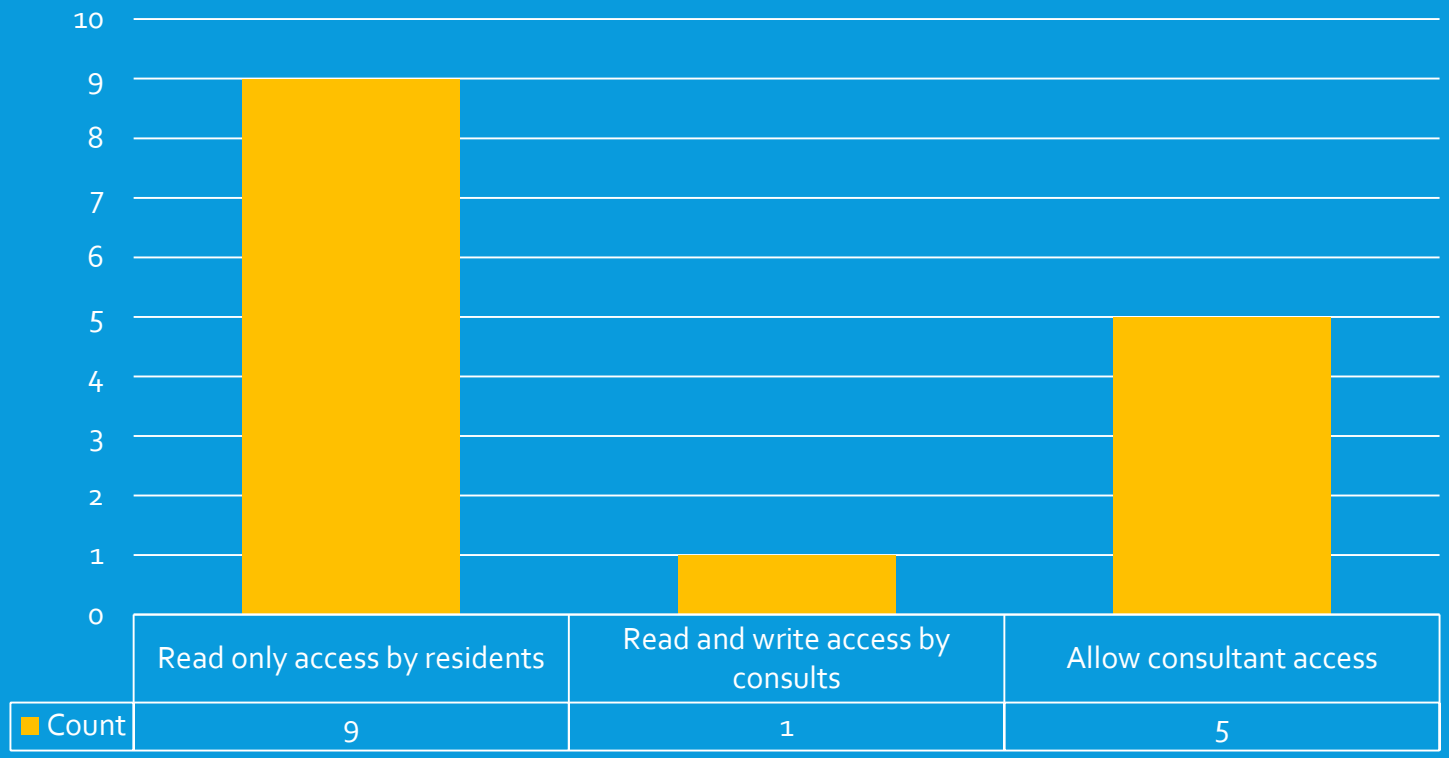
COUNT OF DOES YOUR ROW SOFTWARE USE GIS DATA?



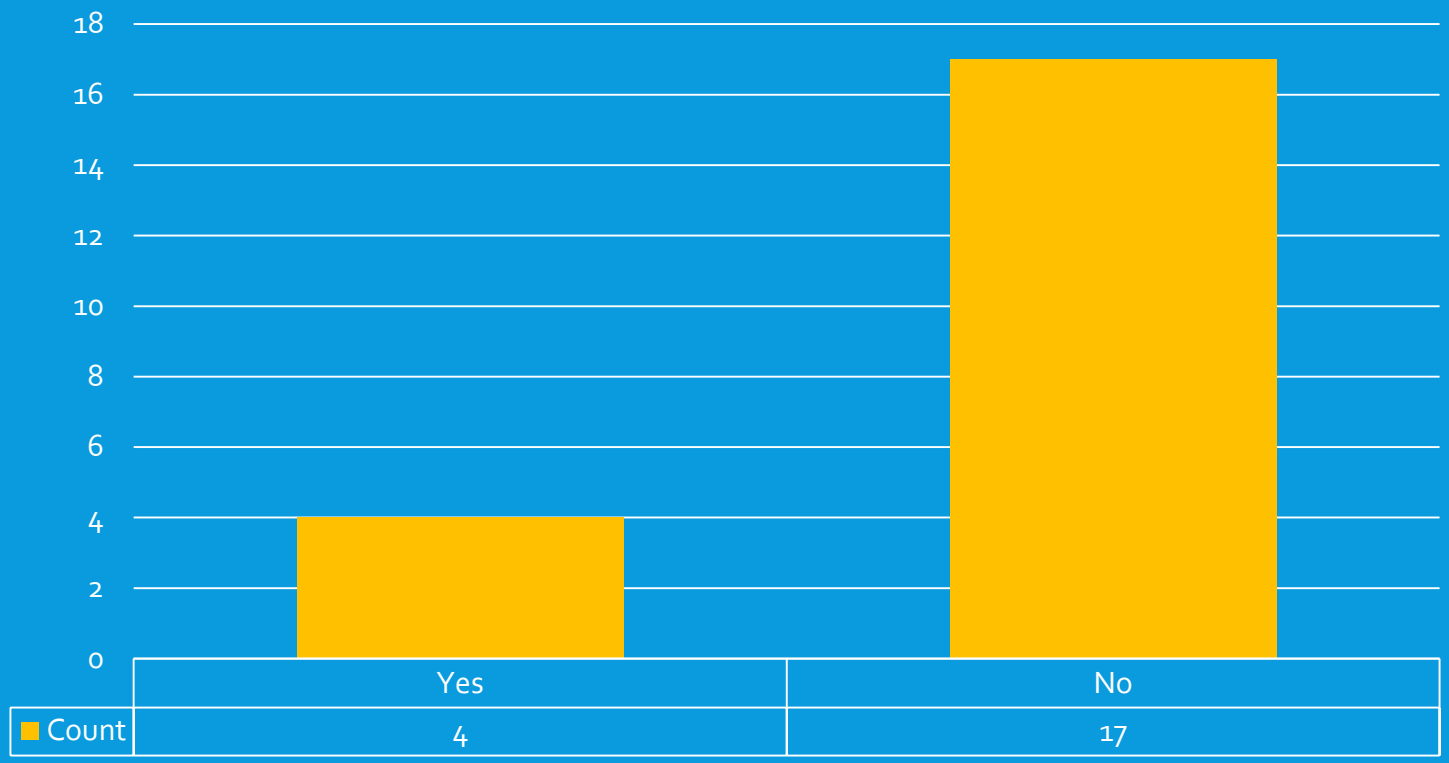
COUNT OF DOES YOUR ROW SOFTWARE INTERFACE WITH:



COUNT OF DOES YOUR ROW SOFTWARE



COUNT OF DOES YOUR ROW SOFTWARE HAVE MOBILE ACCESS?



RANK ORDER OF IMPORTANCE WHEN SELECTING A ROW SOLUTION

- In order of importance

1. Efficiencies in automation
2. Existing system was obsolete
3. Inability to locate/ access/ report on existing data
4. Document management
5. Standardization of process
6. Integrating with other agency or department system
7. Attrition of staff/ maintaining institutional memory

RANK IMPLEMENTATION ISSUES

- In order of biggest issue to smallest

1. Scope creep
2. Poor requirements gathering
3. Lack of clear business objectives
4. Poor internal project management
5. Poor external project management
6. Lack of senior leadership

WHAT ADVICE WOULD YOU GIVE A DOT THAT IS ABOUT TO START A ROW SYSTEM IMPLEMENTATION?

- The business users cannot be fully engaged in existing ROW work to be successful. Use the best project manager you can get.
- Evaluate and select the company, not just the current software offering.
- Have the selection panel understand and agree on the most important issues needed for the new database. The consultant selection process can be unpredictable and you must make the right choice for your unit.
- Take Outdoor Advertising into consideration.
- Make sure you have good oversite between different sections

WHAT ADVICE WOULD YOU GIVE A DOT THAT IS ABOUT TO START A ROW SYSTEM IMPLEMENTATION?

- Spend the time in developing the scope and gathering requirements
- Take your time, talk to the right people. Right of Way Management Systems can be the largest systems within a DOT, so it is important to get it right.
- Ensure that a new system exactly matches what your requirements are and how they are delivered.
- Choose the system offers the most functionalities which meet all functional units' needs/requirements.
- Absolutely review your existing process, it is much easier to start with a streamlined process

WHAT ADVICE WOULD YOU GIVE A DOT THAT IS ABOUT TO START A ROW SYSTEM IMPLEMENTATION?

- Include external RW consultants in the design stage
- Process flows clearly defined prior to RFP. Document collection and develop standardized "electronic" formatted documents prior to RFP.
- Take the time to fully document your current process so you are aware of areas that could use some "updating". Be prepared for change. Keep an open mind.