

Creating a National Online Non-motorized Traffic Count Archive: *Process and Progress*

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and

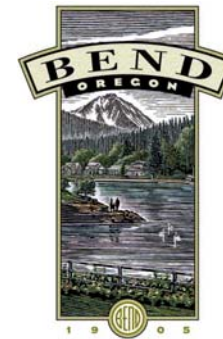
Elizabeth Stolz



Thank you to our partners!



Oregon
Community
Foundation



Overview

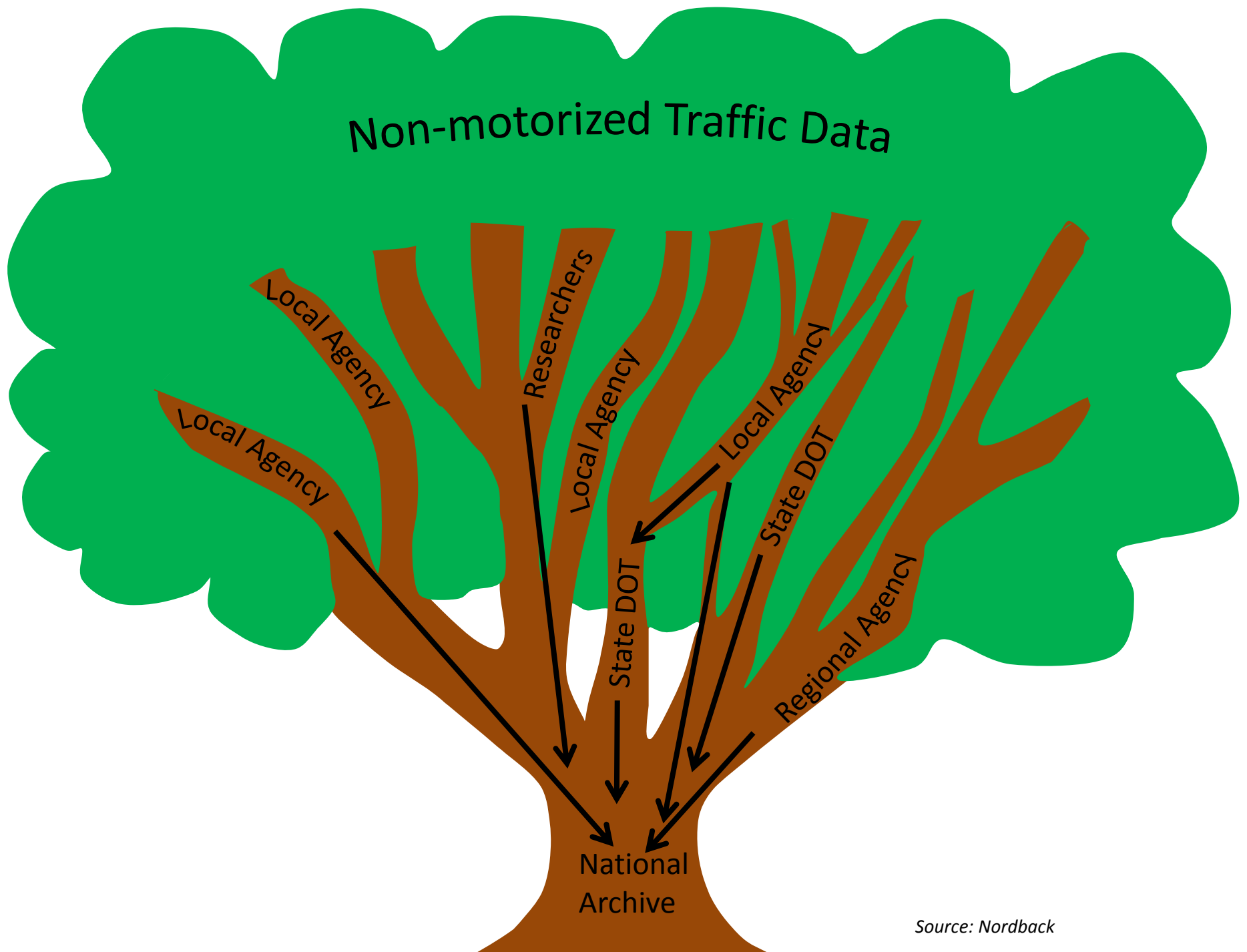
- Motivation
- Functional Requirements
- Architecture
- Schema
- Conclusions/Next Steps



Motivation

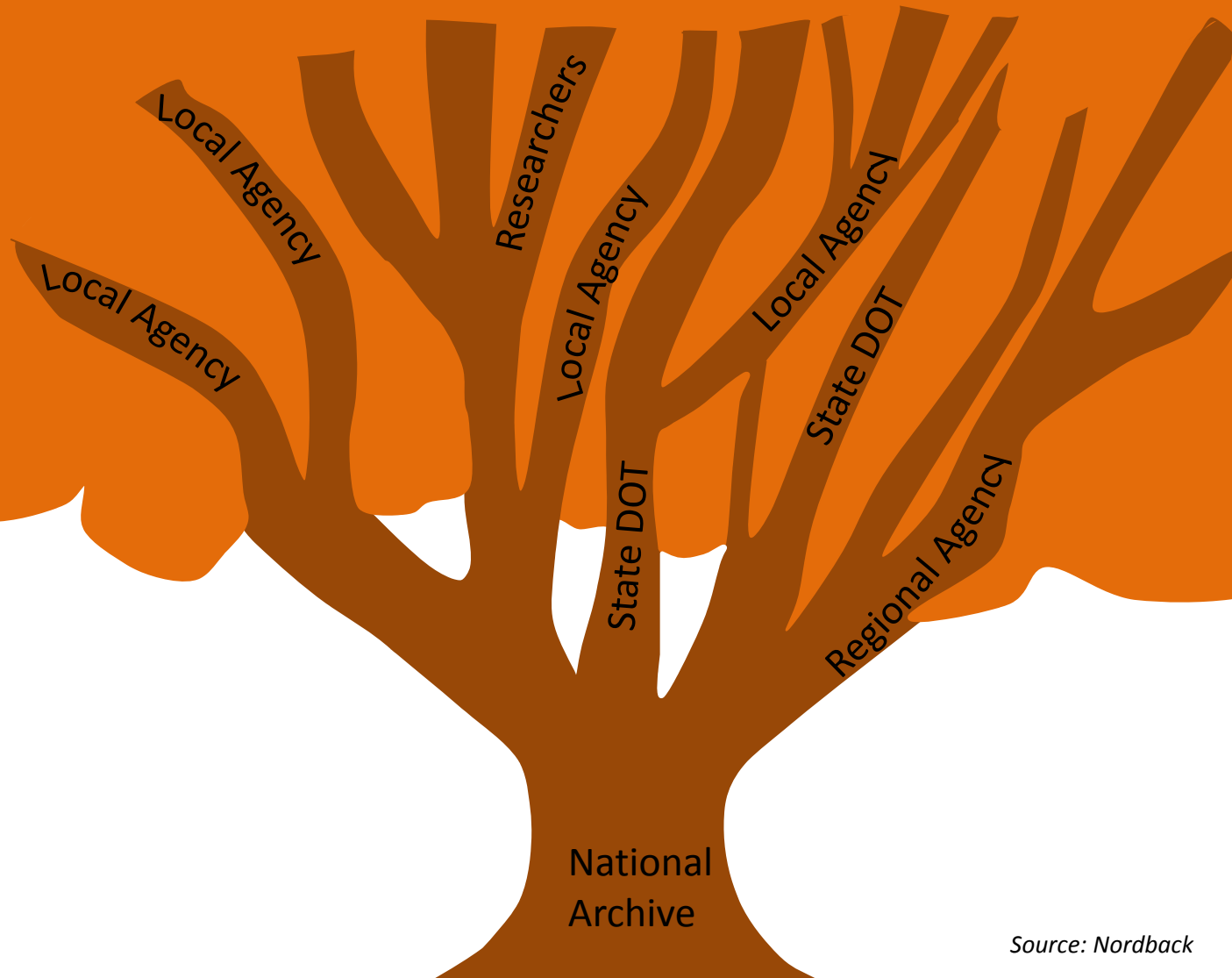
Why aggregate bicycle and pedestrian count data?



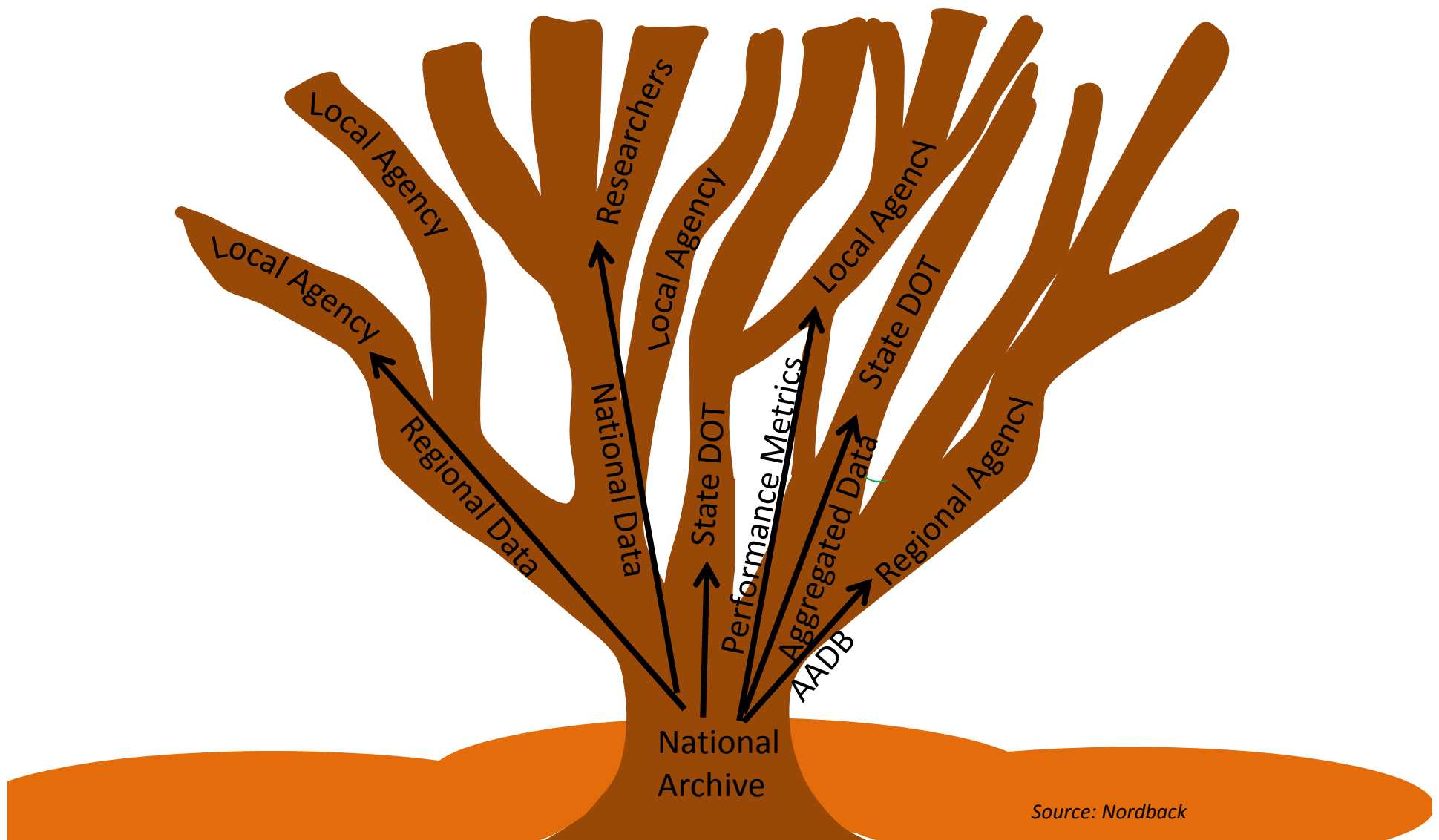


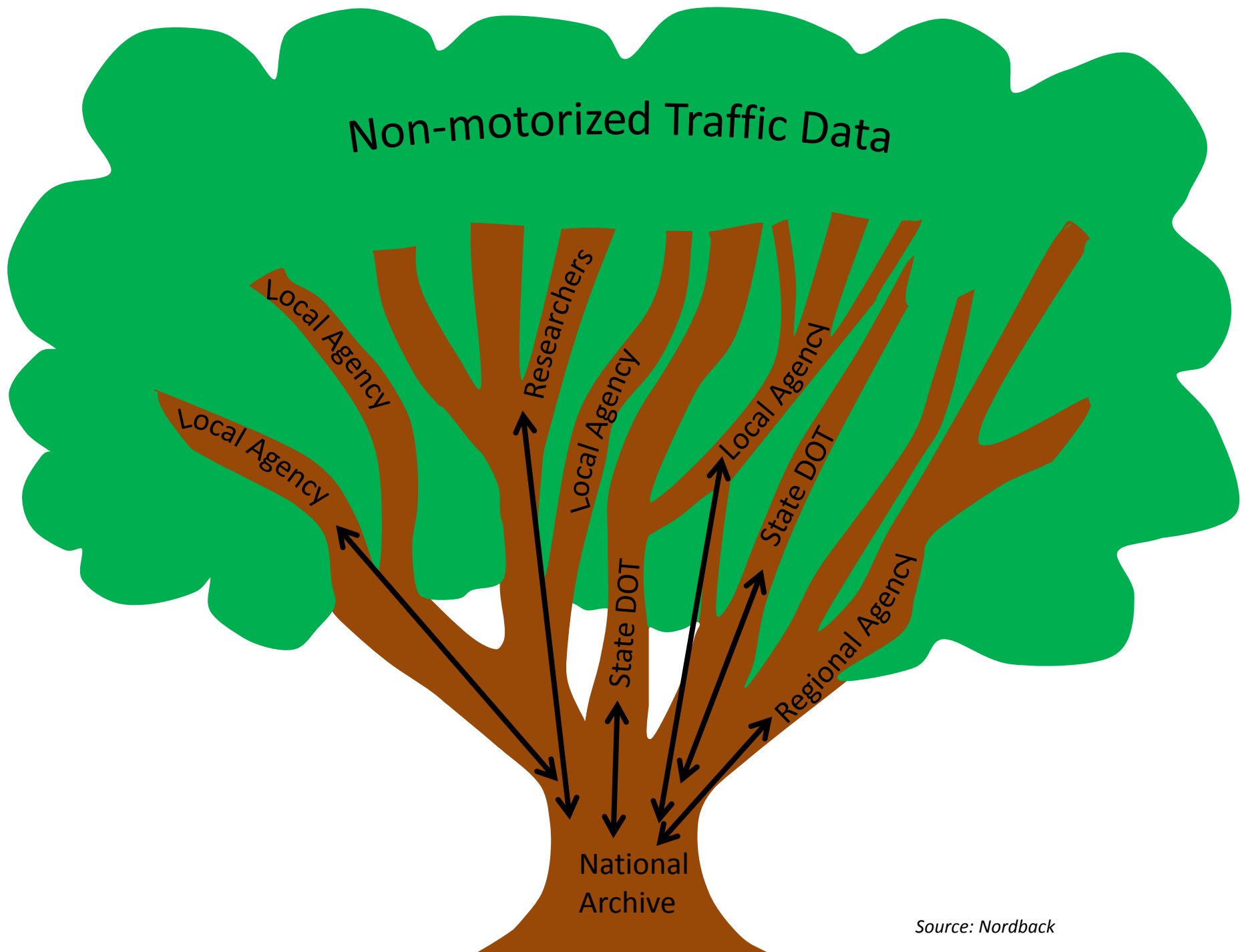
Source: Nordback

Non-motorized Traffic Data



Source: Nordback





Source: Nordback

Many Formats

```

>>>>>>
Factory: _B3.84_C2.77_F8127_EY_ME_D1
=DOCK TIME (yy-mm-dd hh:mm):10-07-19 11:12:40
Counter log start
  
```

System check

Transportation Development Division - TSM Unit

Site Number:	26200	Site Name:	I-205 Bike Path	Region:	1	Vehicle Type:	Vehicles	County:	Multnomah
Street Number:	64	Mile Point:	20.35	Start Date:	1/1/2013	Lane / Direction / Flow:	Combined		
ADT:	117	Avg Weekdays (Mon - Thu):	120	Avg Day:	118				
Max Hour:	24	Day:	Sat	Date:	1/19/2013	Hour:	16		
Max Day:	156	Day:	Tue	Date:	1/8/2013				

I2_d

00:Y:000

Sunday		Monday		Tuesday		Wednesday		Thursday	Friday	Saturday
Date	Value	Date	Value	Date	Value	Date	Value			
1/6	89	1/7	103	1/8	156	1/9	110			
1/13	103	1/14	97	1/15	129	1/16	127			
1/20	105	1/21	138	1/22	136	1/23	80			
1/27	102	1/28	91	1/29	104	1/30	-			
Avg:	100	Avg:	107	Avg:	136	Avg:	108			

00-:15

A3 A2 A1

N

Date	Day	1	2	3	4	5	6	7	8	9	10	11	12
1/1	Tue	2	0										
1/2	Wed	1	0										
1/3	Thu	1	1										
1/4	Fri	0	0										
1/5	Sat	1	1										
1/6	Sun	1	4										
1/7	Mon	0	0										
1/8	Tue	4	0										
1/9	Wed	1	1										
1/10	Thu	1	0										
1/11	Fri	1	0										
1/12	Sat	4	0										
1/13	Sun	0	1										
1/14	Mon	1	0										
1/15	Tue	1	1										
1/16	Wed	2	1										
1/17	Thu	0	2										
1/18	Fri	1	1										
1/19	Sat	3	0										
1/20	Sun	0	0										
1/21	Mon	0	2										
1/22	Tue	0	1										
1/23	Wed	1	3	0	0	1	3	3	5	6	6	0	7
1/24	Thu	0	2	1	0	0	3	7	10	12	7	5	6
1/25	Fri	1	1	1	0	0	2	5	14	9	2	1	9
1/26	Sat	1	0	2	1	1	0	1	2	6	6	7	14
1/27	Sun	2	2	3	0	0	1	1	3	1	8	13	9
1/28	Mon	0	1	0	0	1	1	4	15	4	7	2	2
1/29	Tue	1	1	0	0	0	5	9	9	7	5	2	1
1/30	Wed	-	-	-	-	-	-	-	-	-	-	-	-

File Name: N:\STAFF-FOLDERS\LGoedde\Denver\DENVER COUNTS\16TH&W

Start Date: 9/16/2009

Start Time: 4:30:00 PM

Site Code: 23

Comment 1:

Comment 2:

Comment 3:

Comment 4:

B3

B2

B1

	16TH Southbound				WYNKOOP Westbound				16TH Northbound				WYNKOOP Eastbound			
Start Time	Left	Thru	Right	Bike	Left	Thru	Right	Bike	Left	Thru	Right	Bike	Left	Thru	Right	Bike
04:30 PM	0	0	0	3	0	0	0	5	0	0	0	1	0	0	0	2
04:45 PM	0	0	0	2	0	0	0	4	0	0	0	1	0	0	0	2
05:00 PM	0	0	0	1	0	0	0	2	0	0	0	7	0	0	0	8
05:15 PM	0	0	0	6	0	0	0	3	0	0	0	2	0	0	0	2



Compatibility

- Include TMG format critical fields
- Informed by
 - National Bicycle and Pedestrian Documentation Project
 - UCLA Bike Count Data Clearinghouse

Bicycle/Pedestrian Data Collection - Screenline Count Form

Date DAY MONTH YEAR 20

Location STREET PATH BETWEEN AND

Count Period FROM TO AM PM

Rain YES NO

Bicyclists

Count bicyclists when they cross this imaginary line

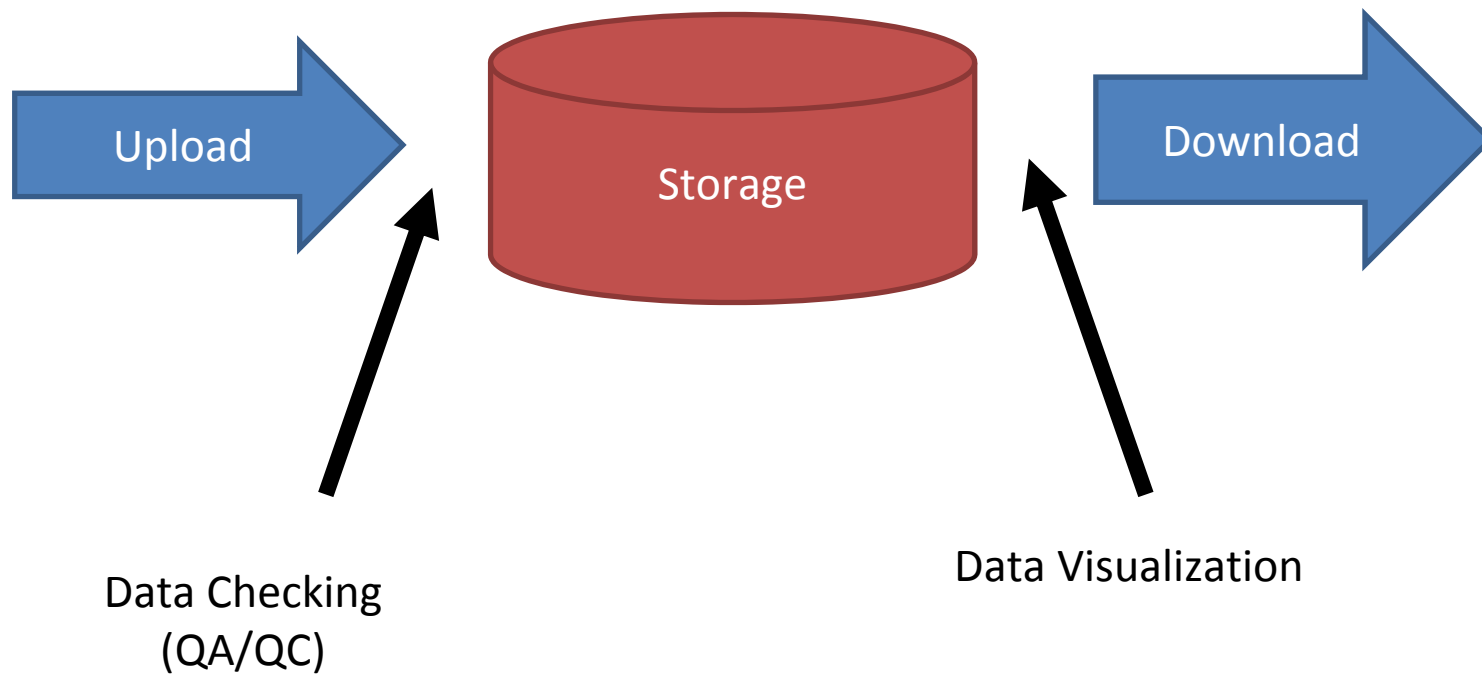
Bikes - Right to Left

<http://www.bikecounts.luskin.ucla.edu/>

1	NATIONAL BICYCLE AND PEDESTRIAN DOCUMENTATION		
2	BACKGROUND DATA SHEET		
3			
7	Contact Information:	Enter here	
8	Lead Person Name	Enter here	
9	Address	Enter here	
10	E-mail	Enter here	
11	Phone	Enter here	
12			
13	General Area Background:	Local Community	
14	Name of jurisdiction(s):	Enter here	
15	If County or Region, number of local agencies:		
16	Source of demographic data:	Enter here	
17	Year of data:	Enter here	
18	Population:	Enter here	
19	Density (people per square mile):	Enter here	
20	Bicycle Mode Share: US Journey to Work		
21	Pedestrian Mode Share: US Journey to Work		

Functional Requirements

Bike/Ped Portal





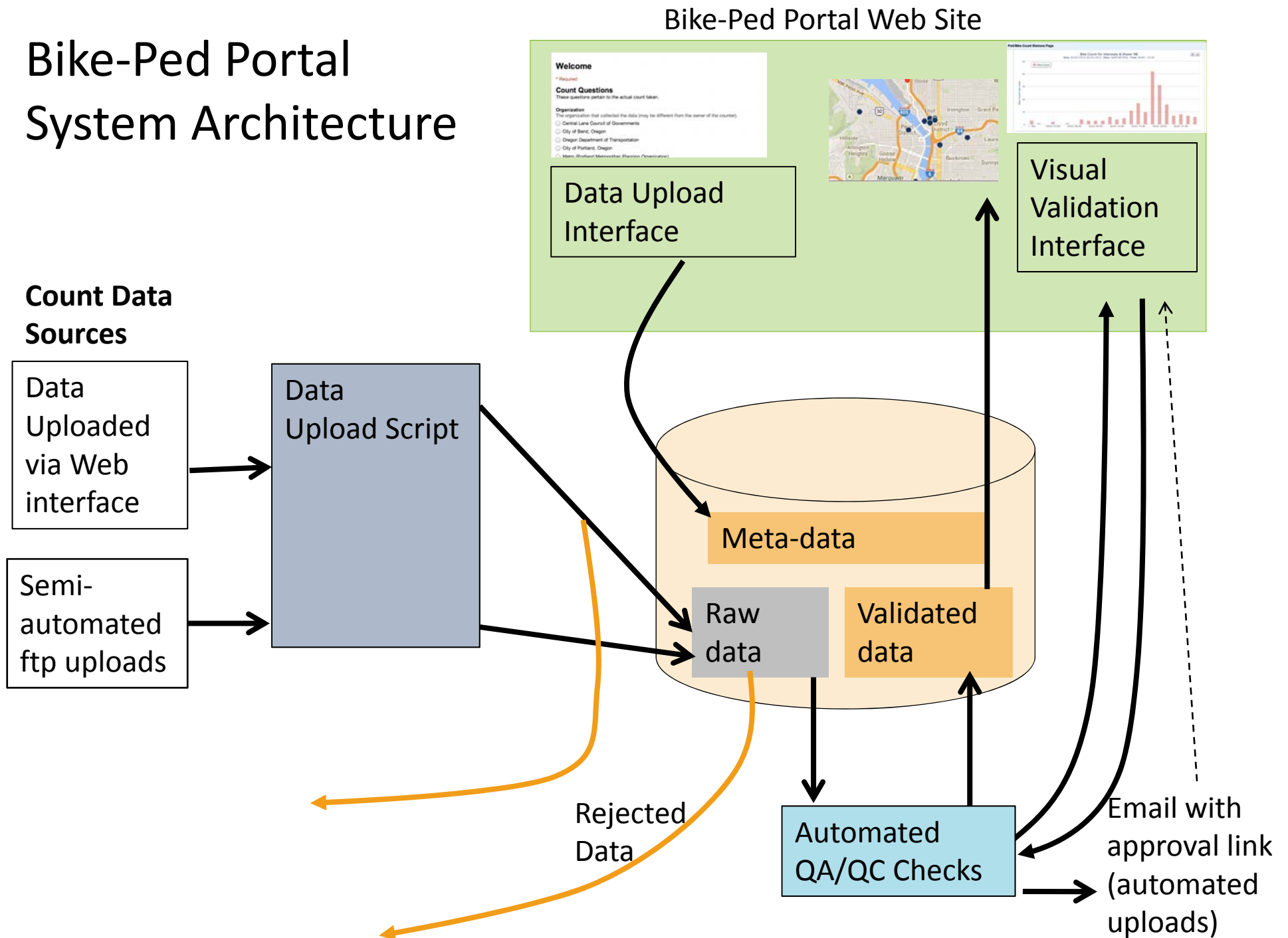
Functional Requirements

- Input Tool
- QA/QC Tool
- Data archive and metadata
- Output Tool
- Data to include
 - Manual and automated
 - Road and path segments
 - Bicycle and pedestrian counts



Architecture

Bike-Ped Portal System Architecture



Schema

Use Case – Mobile counters

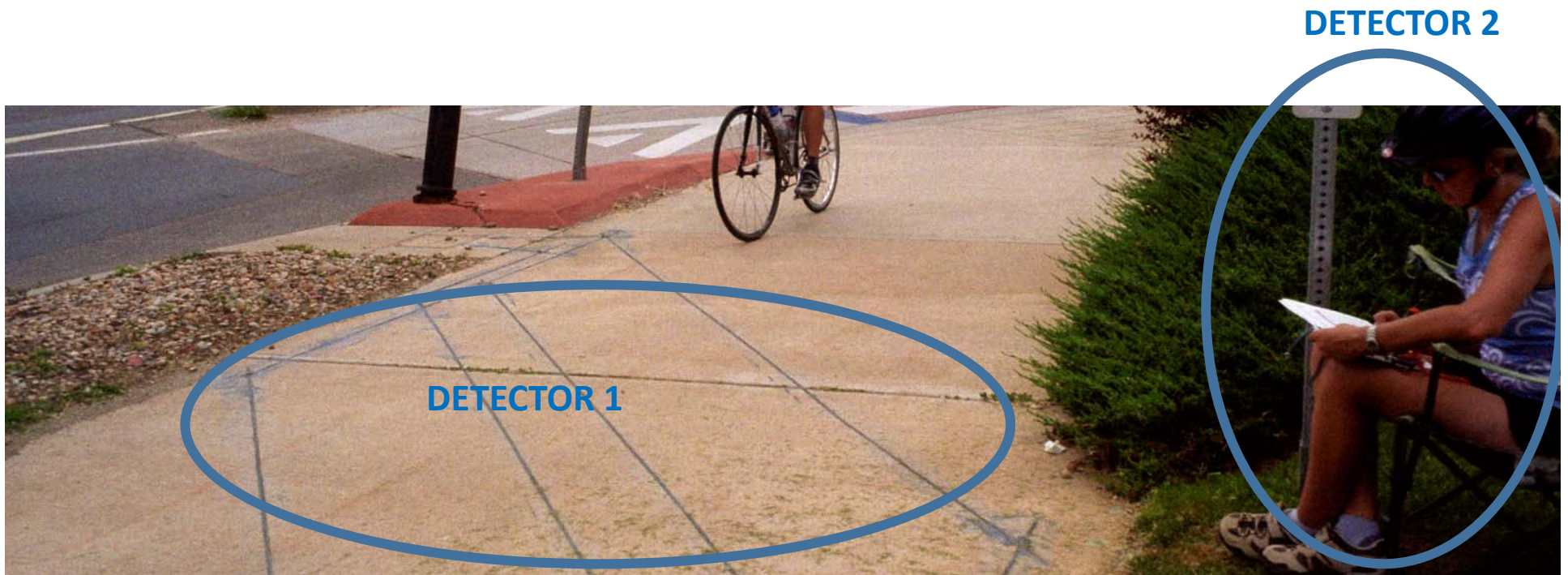


The same detector can be associated with multiple facilities and flows (at different times).

Use Case

Validation Counts – Manual counts checking automated counter

- Multiple counts of the same flow at the same time with different “detectors”



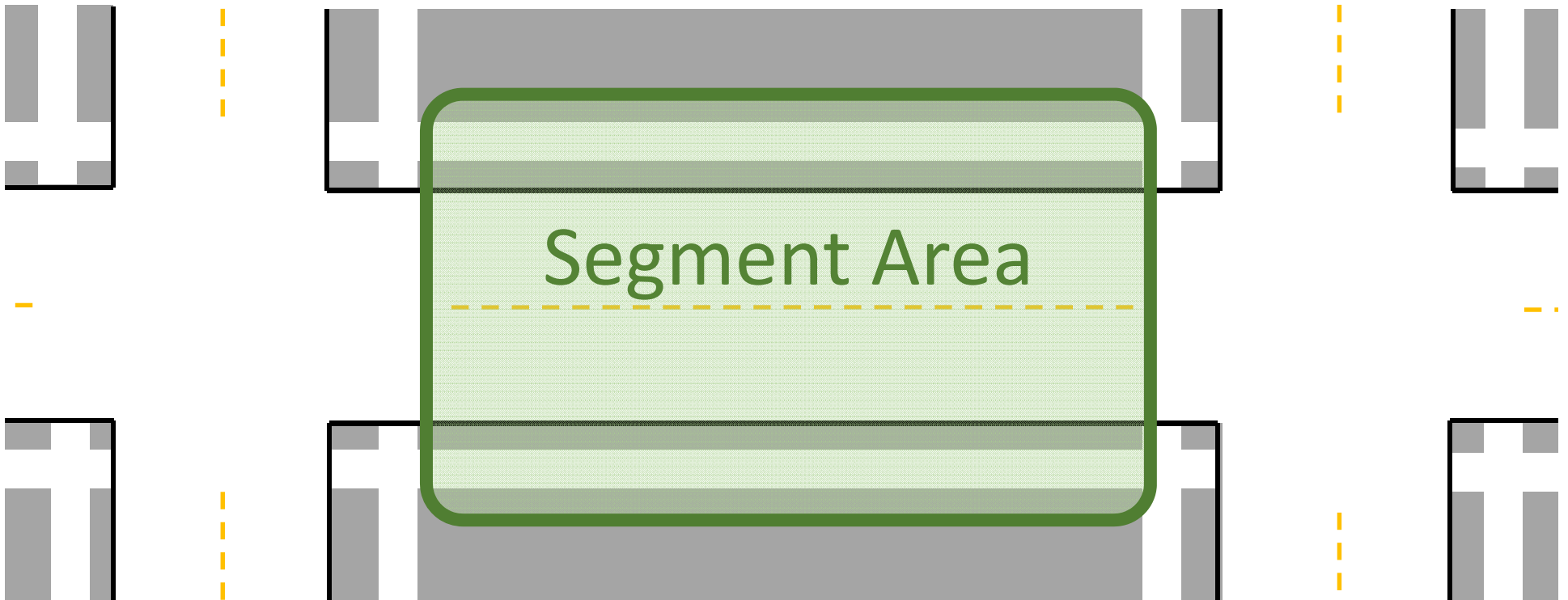
Schema Elements

- Segment Area
- Facility
- Flow
- Detector
- Count Descriptor
- Count Data

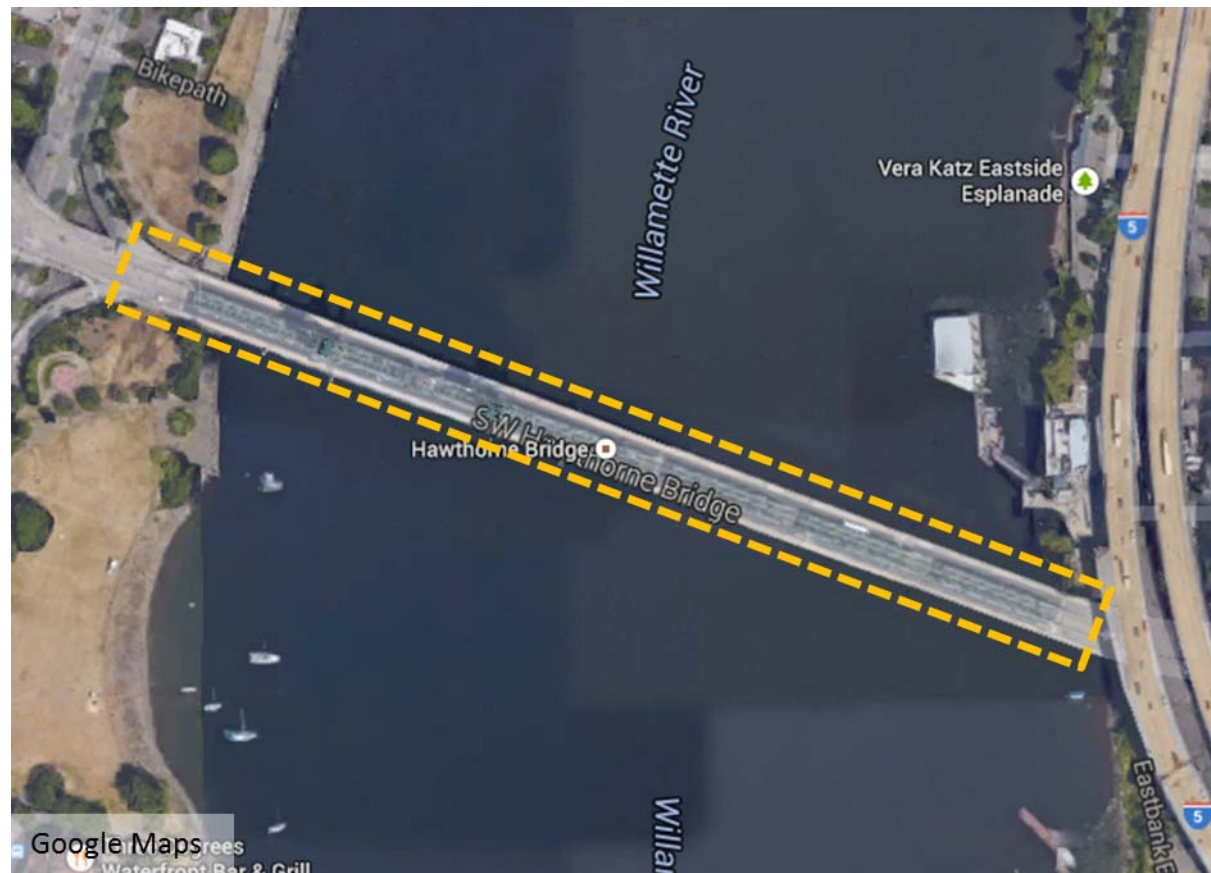


Segment Area

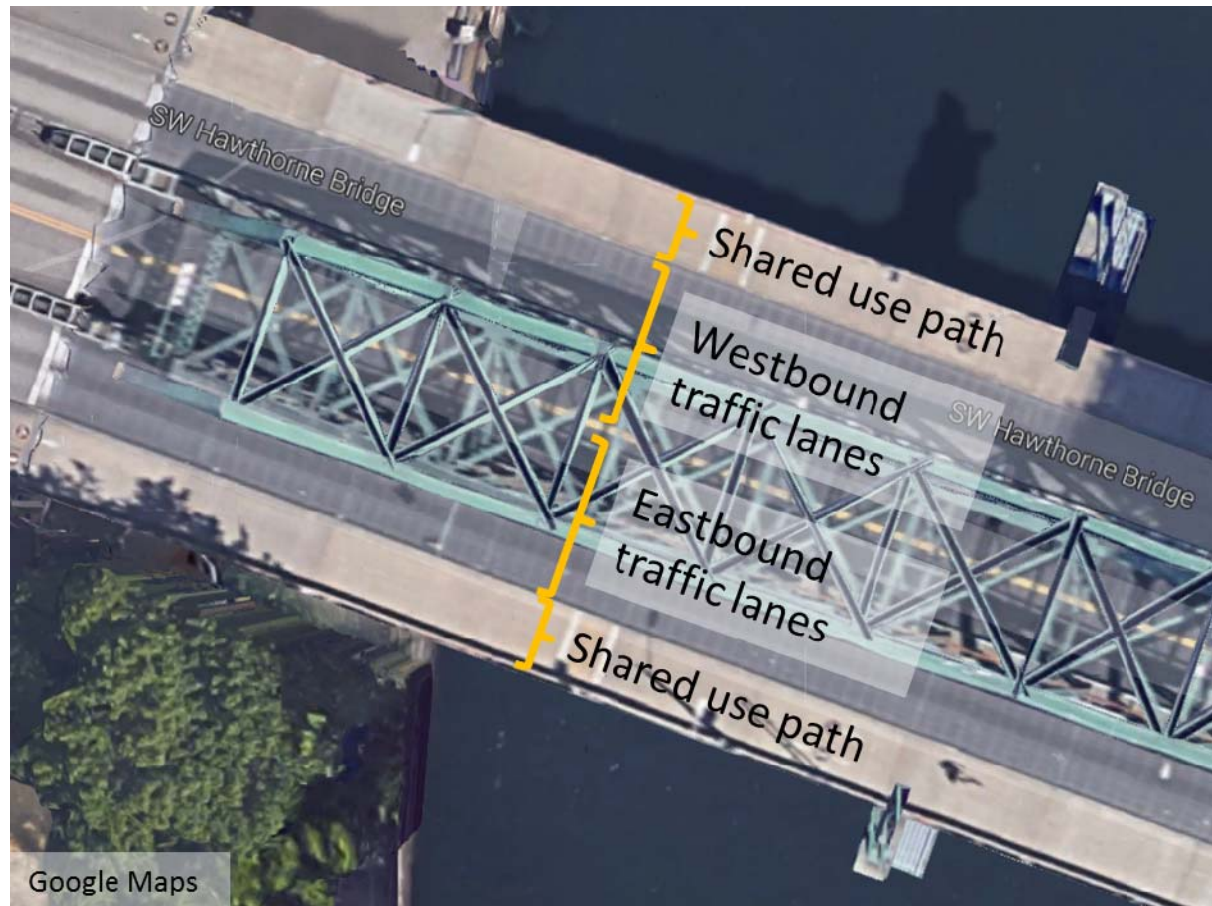
A segment area is a stretch of transportation right-of-way over which the volume of non-motorized traffic is not expected to substantially change.



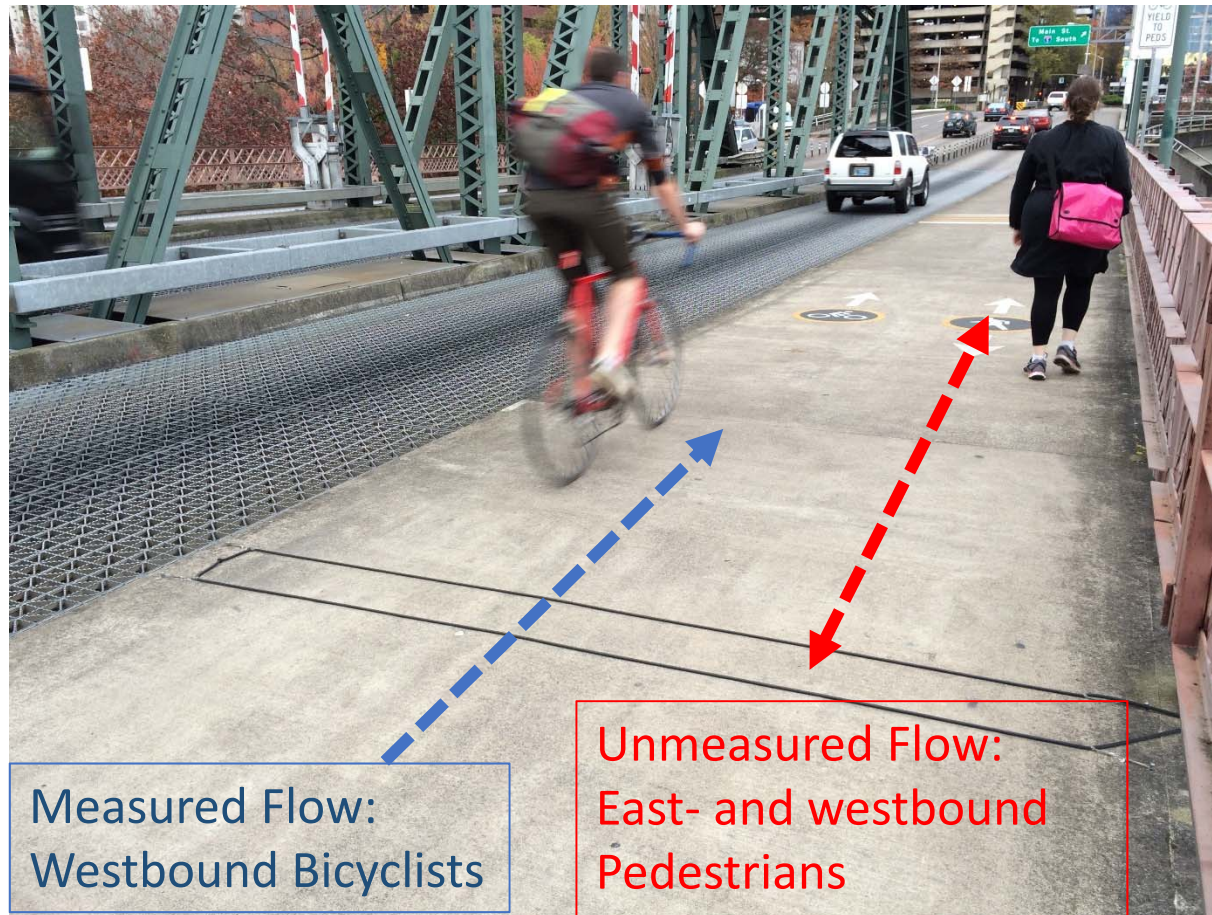
Example Segment Area



Example Facility



Example Flow

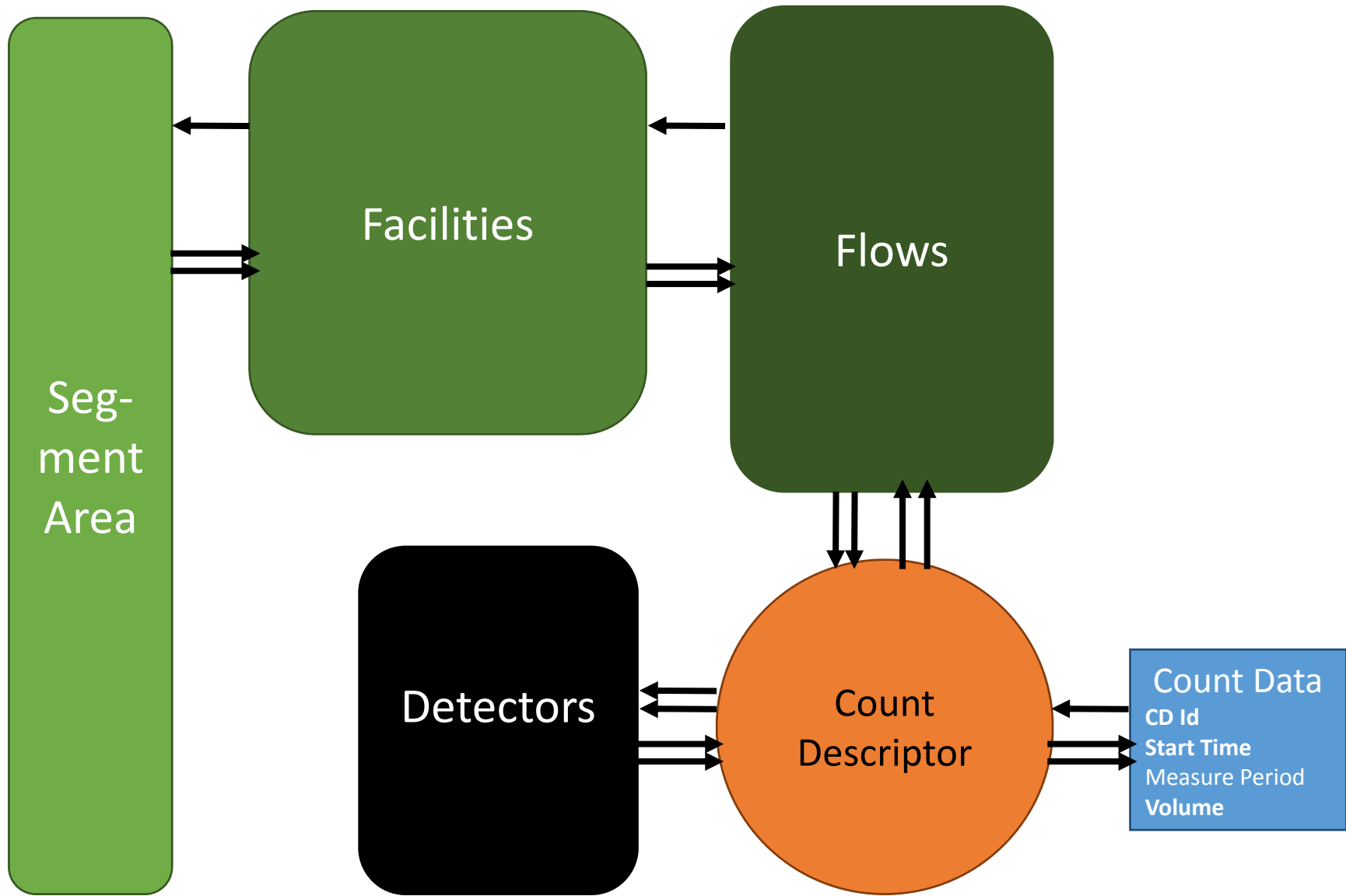


Example Detector



} Detector

Schema



Conclusions

Conclusions

- Data sharing makes the most of the data we have
- Bicycle and pedestrian count data are complex
- Designed for compatibility
- Connecting a “Detector” with a “Flow” via a table adds **versatility** to the schema
 - Allows archive to handle mobile counters
 - Allows multiple counts of the same flow/time (as for validation counts)
- Minimizing data in count data table
 - Saves memory
 - Improves performance/efficiency

Next Steps in Phase I

- User data input interface
- Automated upload
- User data output interface
- Basic QA/QC



Phase II and beyond

- Future Phases (unfunded)
 - Enhanced QA/QC
 - Analysis tools
 - Summary Statistics
 - AADT from short duration counts
 - Integrating with weather data



Questions?

Krista Nordback

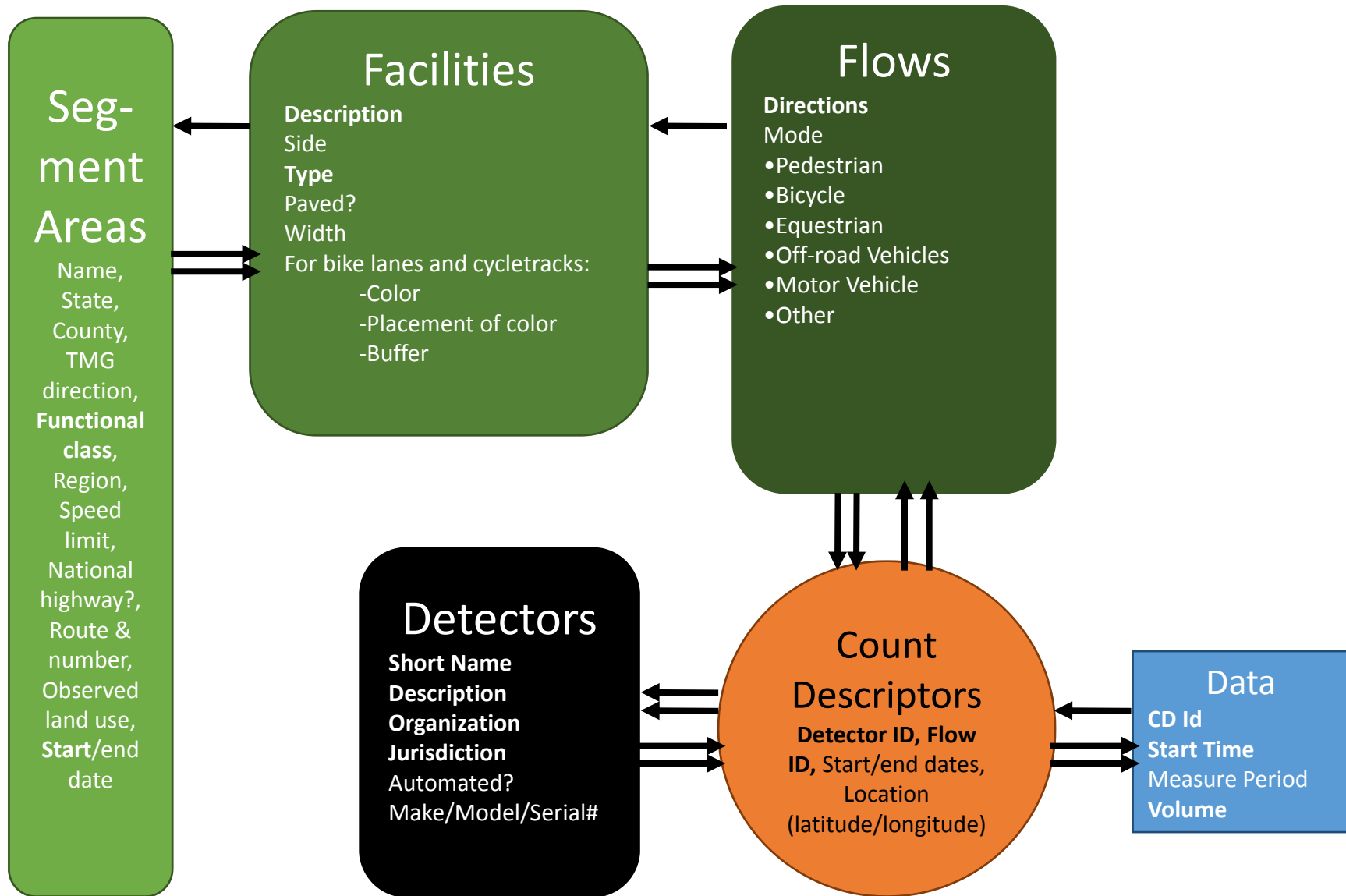
Nordback@pdx.edu

503-725-2897

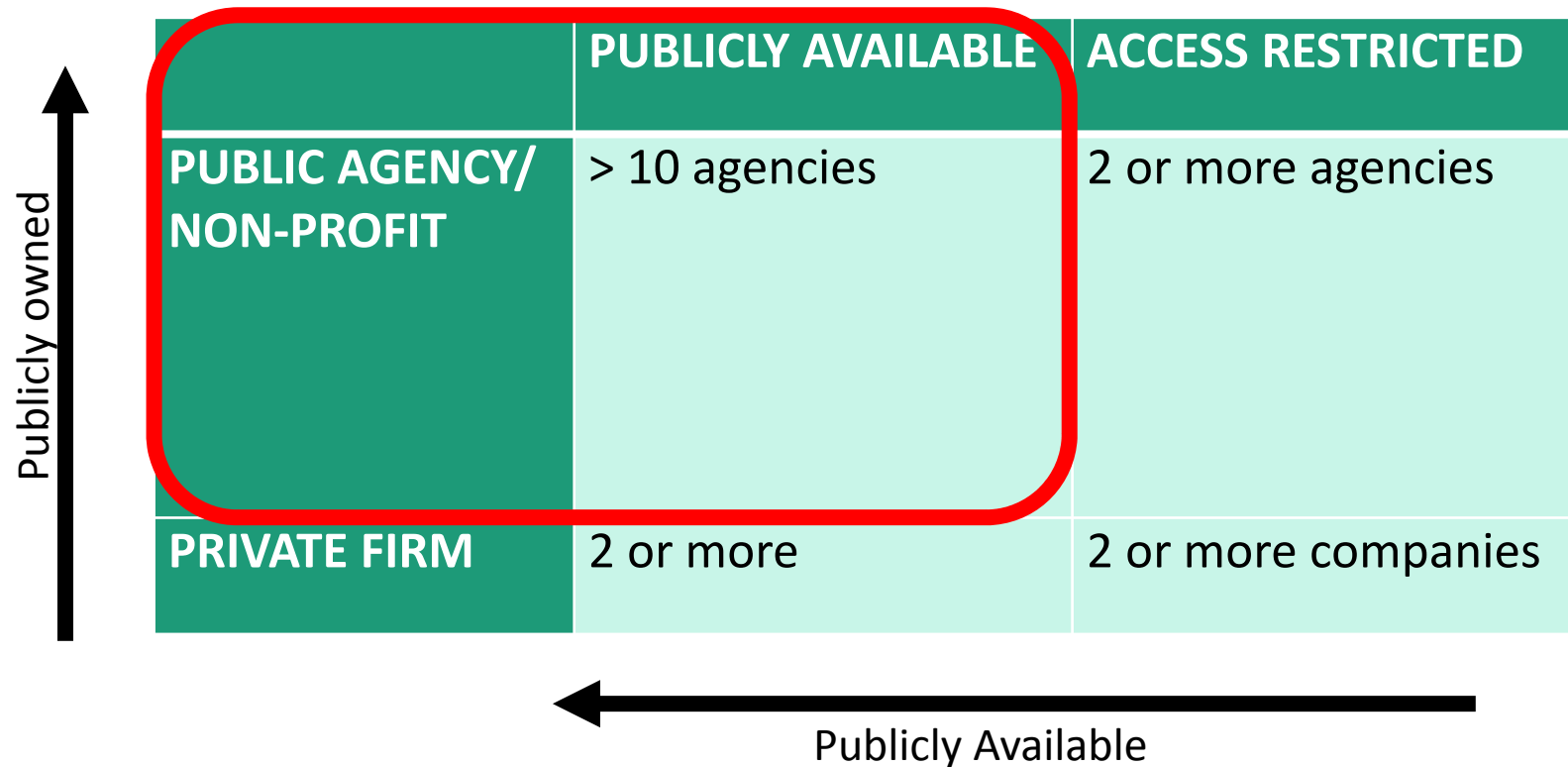


EXTRA SLIDES

Schema



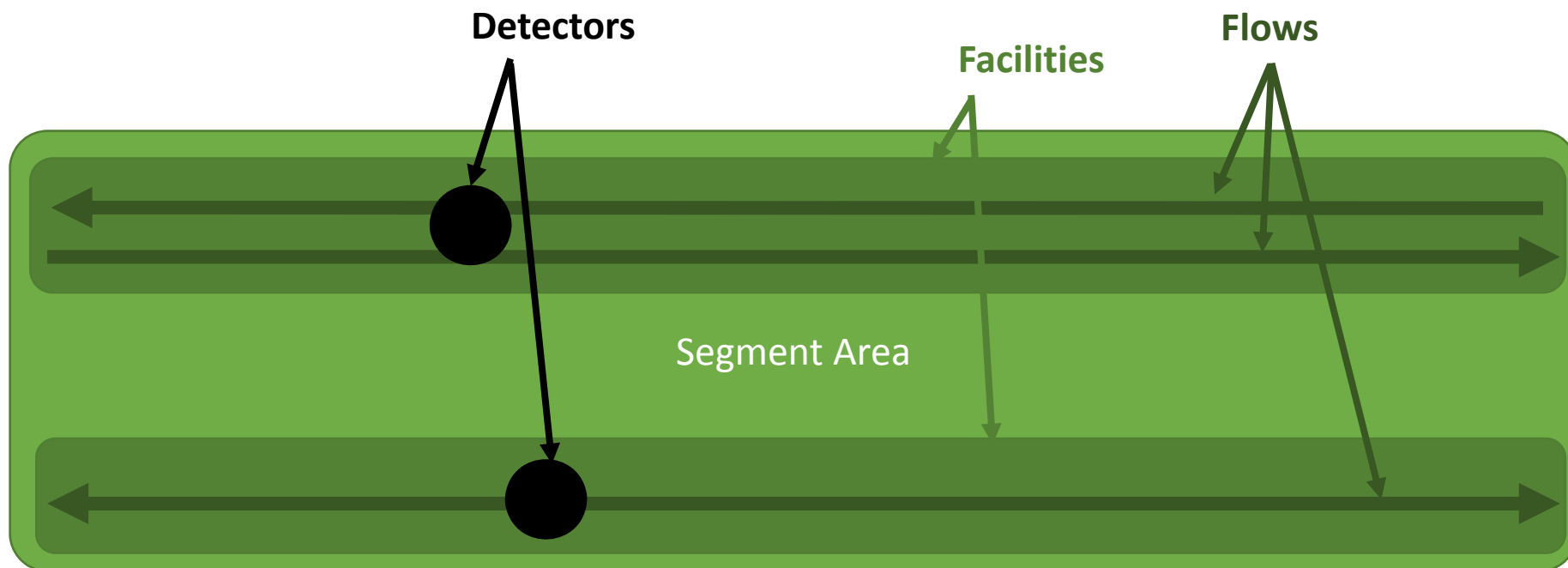
Types of Data Warehouses



Public Archive Examples

Agency	Data Types		Map?	Graph?	Allows Data Download	Other
	Duration	Automated?				
Delaware Valley Regional Planning Commission	One week	✓	✓	✓	✓	Weather
Arlington, Virginia	Permanent	✓	✓	✓	✓	Weather
Portal	Permanent	✓	✓	✓		
Lane Council of Governments	>24 hr	✓	✓		✓	Weather, photos
LA Metro	2 hour		✓		✓	Allows data input
Seattle, WA	Permanent	✓	✓	✓		Weather

Only one allows data input. None facilitate online data input for automated counts.



AMI and WWI

$$AMI = \frac{\sum_{h=7}^8 v_h}{\sum_{h=11}^{12} v_h}$$

where:

AMI = Average Morning/Midday Index

v_h = Average weekday hourly count for hour (h) where hours are given as starting time of the hour

$$WWI = V_{we}/V_{wd}$$

where:

WWI = Weekend/Weekday Index

V_{we} = average weekend daily traffic

V_{wd} = average weekday daily traffic

Miranda-Moreno, L. F., Nosal, T., Schneider, R. J., & Proulx, F. (2013). *Classification of bicycle traffic patterns in five North American Cities*. Paper presented at the Annual Meeting of the Transportation Research Board, Washington, DC.

AADT Computation

Two methods

- If full 365 days available, sum and divide by 365.
- If at least a week per month are available, use AASHTO method:

$$AADT = \frac{1}{7} \sum_{i=1}^7 \left[\frac{1}{12} \sum_{j=1}^{12} \left(\frac{1}{n} \sum_{k=1}^n DT_{ijk} \right) \right]$$

where

DT = daily traffic for day k , of day of the week i , and month j

i = day of the week

j = month of the year

k = index to identify the occurrence of a day of week i in month j

n = the number of occurrences of day i of the week during month j