CAMBRIDGE SYSTEMATICS

Think Forward

Update, Calibration, & Validation

presented to

Caltrans District 1

presented by

Cambridge Systematics, Inc.

& Caliper Corporation

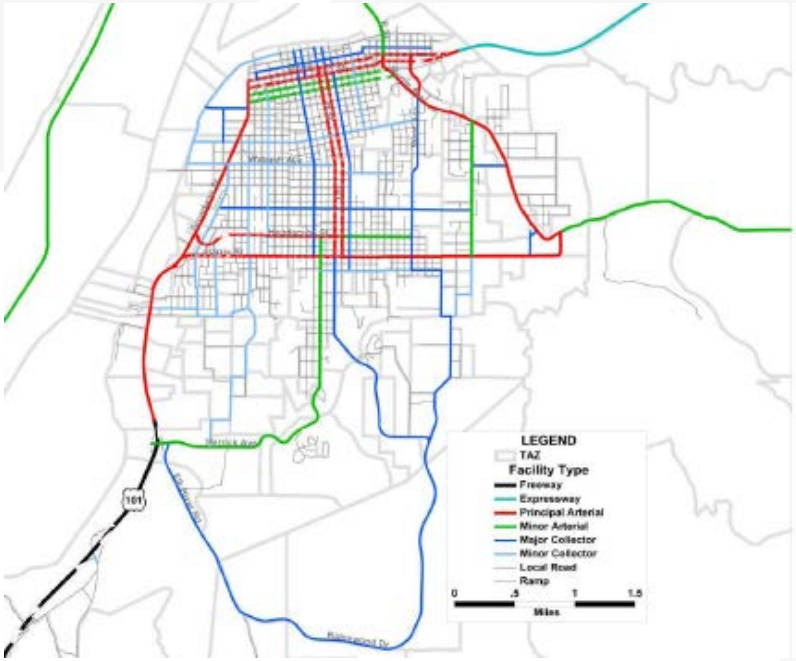
4/12/2016

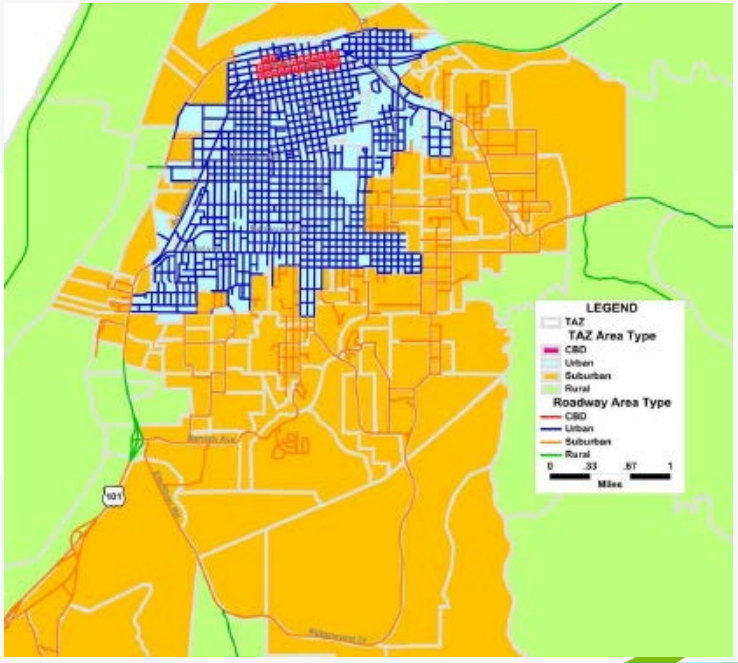
Overview

- Discussion of:
  - Input Updates
  - Model Step Updates
- Use the HCAOG Documentation as a guide

Roadway Networks

- Basic Updates
  - » Facility Type, lanes, center turn lane, speed limit
  - » Area Type (related to SED, TAZs)





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Roadway Networks

- Validation Data Updates
  - Traffic Count Data
    - Base year +/- about 3 years
    - Must Have: 24-hour 2-way
    - If Possible: AM/PM Peak, by direction
  - Speed Data
    - Helpful **IF** available
    - NPMRDS – HERE data available to MPOs
      - Can HCAOG and/or Caltrans get this data?
      - Is the sample size sufficient in District 1?

TAZ Data

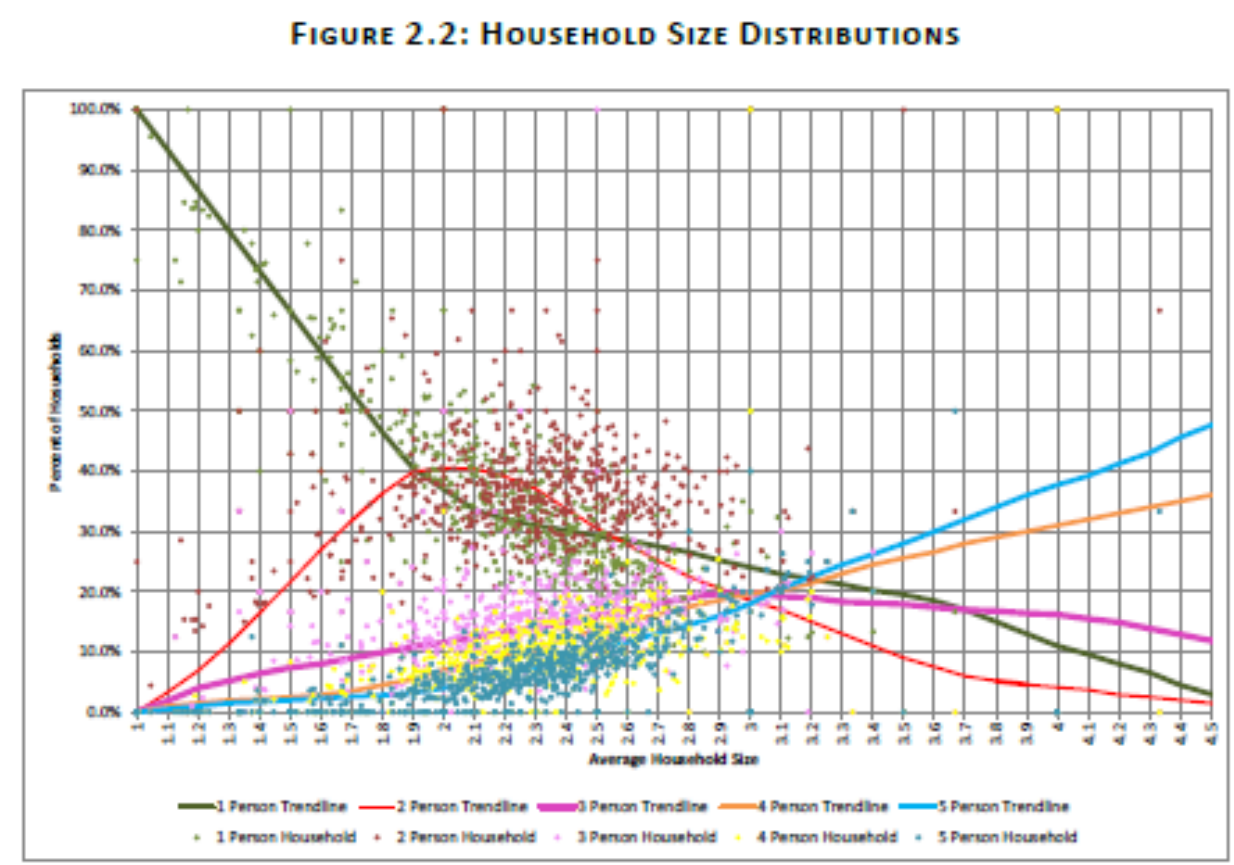
- Household Data
  - From Census / ACS
  - Total Households
  - Average HH Size
  - Median TAZ Income
  - More if required
- Area Type
  - Define at TAZ level and then bring to network
- Employment Data
  - From various sources (e.g., InfoGroup, QCEW)
  - Group by employment type
  - Many challenges with employment data

Trip Generation

- Trip Rate Review
  - Consider looking at new CHTS
  - Reasonableness checks
- Validation Adjustments
  - Sufficient VMT?
  - May need to factor trip rates
- University and Casino Special Generators

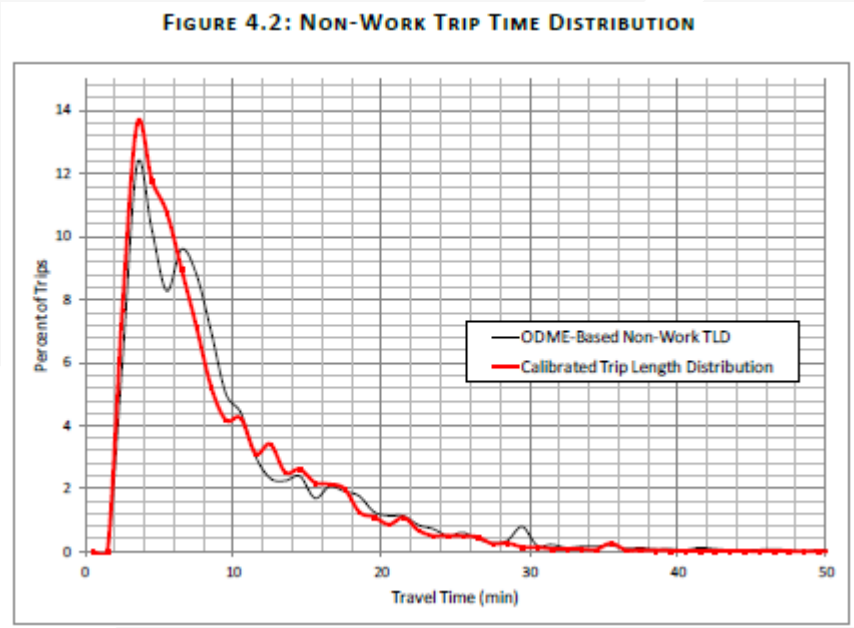
Trip Generation

- Household Disaggregation Models?



Trip Distribution

- Recalibrate to current data
  - CTPP
  - CHTS (if sufficient records are available)
  - ODME
- Targets:
  - Trip Length Frequency Distribution (TLFD)
  - Average Trip Length
  - % Intrazonal
  - District to District
- Example and technical discussion



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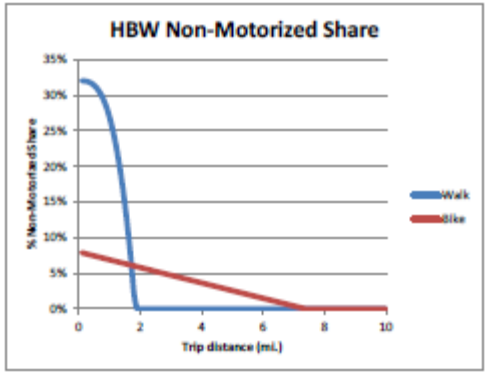
Mode Split

- Non-Motorized
  - » Distance based: Shorter trips → More likely to walk/bike
  - » Calibrate to ACS or CHTS shares



- Transit
  - » District based:
    - Transit trips can only happen where transit service is available
    - More likely with one-seat ride
  - » Calibrate to observed boarding data

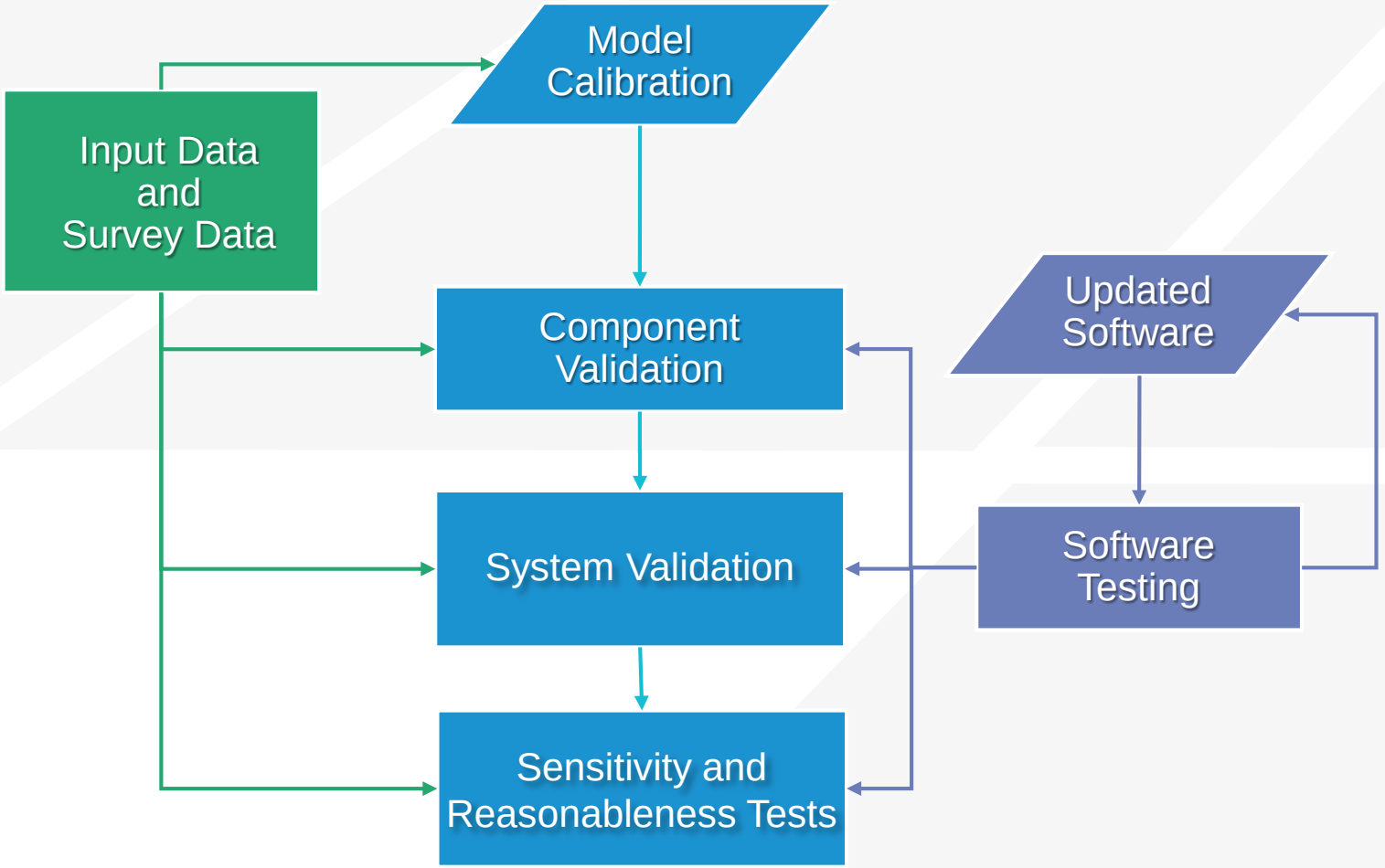
Traffic Assignment

- Compare volumes to counts
  - Most focus is on 24-hour conditions
  - Some focus on peak hours and directional splits
- Statistics
  - R-squared, RMSE, Volume/Count ratio
  - Regional, subarea
  - By FT and AT
- Corridor review and mapping
- “Top 10” Errors

Traffic Assignment

- Option: Speed Data
  - Done less frequently
  - Requires additional data
- Skim Validation
  - Can be done with CHTS if enough data
  - Are reported times generally faster or slower than modeled times
    - Must evaluate to eliminate rounding bias
    - People tend to round times to 5, 10, or 15 minute increments.

Validation Approach



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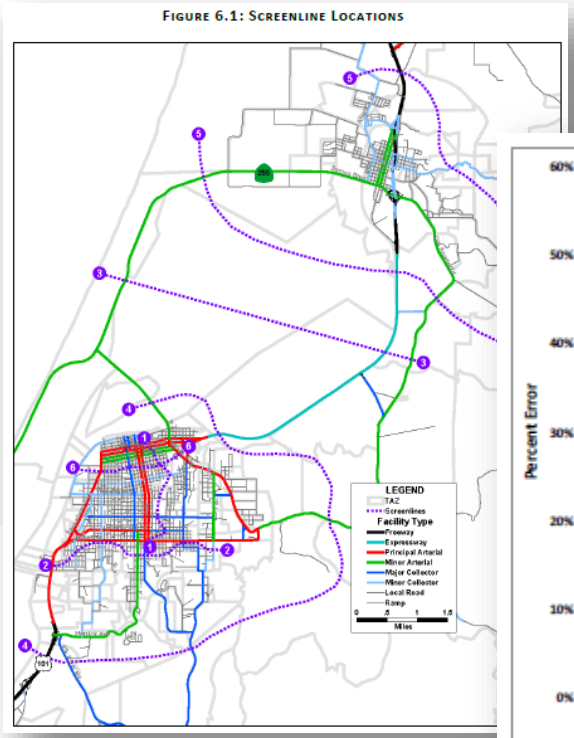
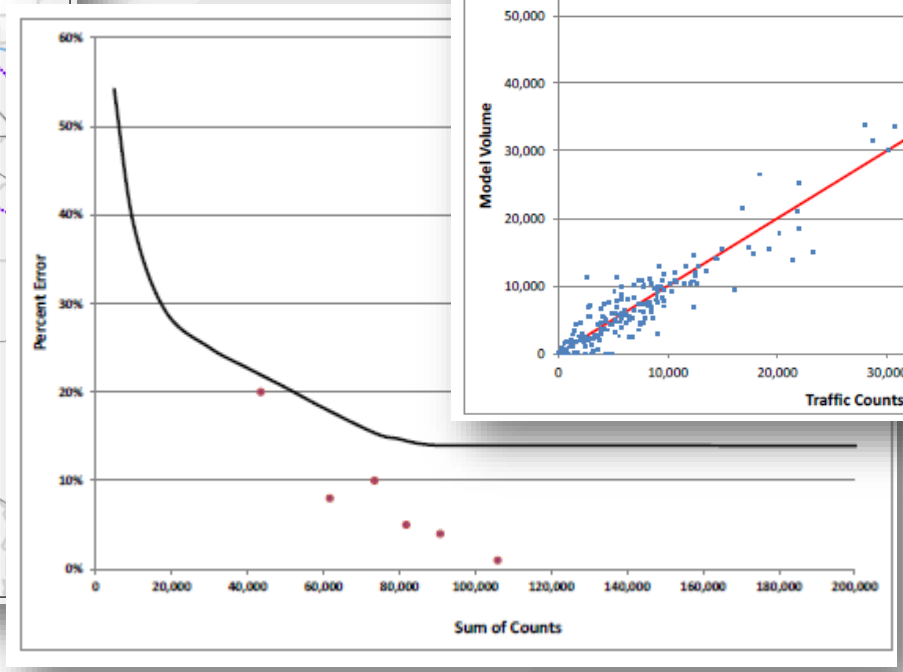
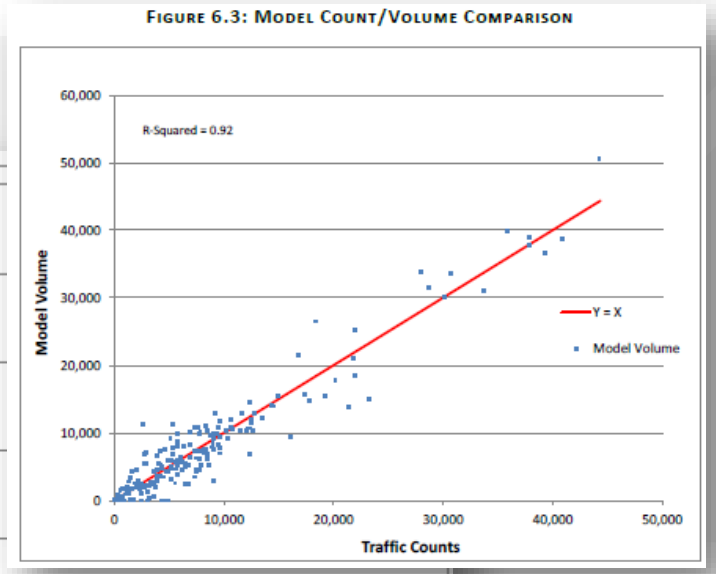
HCAOG Validation Figures







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HCAOG Validation Figures

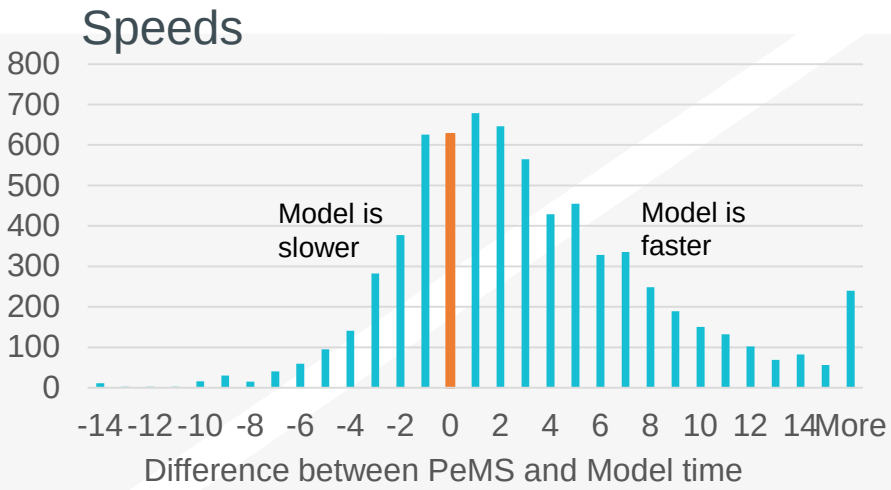
TABLE 6.9: MODEL % ROOT MEAN SQUARE ERROR

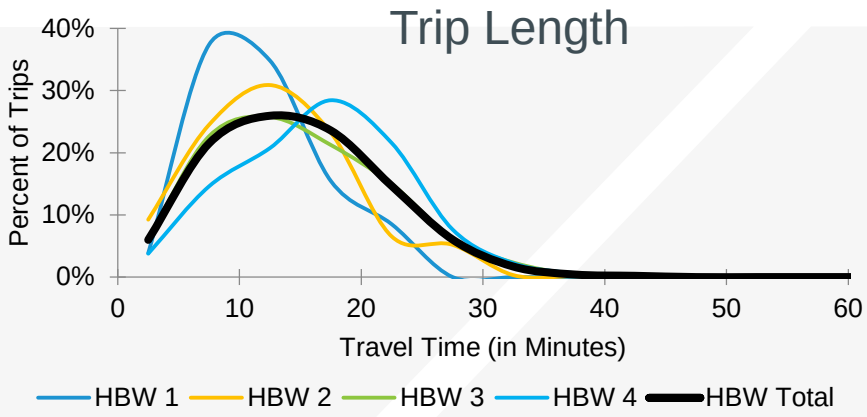
Link Type	Number of Counts	RMSE	% RMSE	Validation Target
Freeway	18	3,537	19.8%	30%
Expressway	4	2,068	6.8%	40%
Principal Arterial	47	2,717	22.1%	40%
Minor Arterial	38	2,467	37.5%	40%
Collectors	59	1,925	45.3%	50%
CBD	7	3,036	26.8%	n/a
Urban	62	2,661	29.2%	n/a
Suburban	53	2,863	33.3%	n/a
Rural	44	1,787	26.0%	n/a
Total	**166**	**2,508**	**30.0%**	**40%**

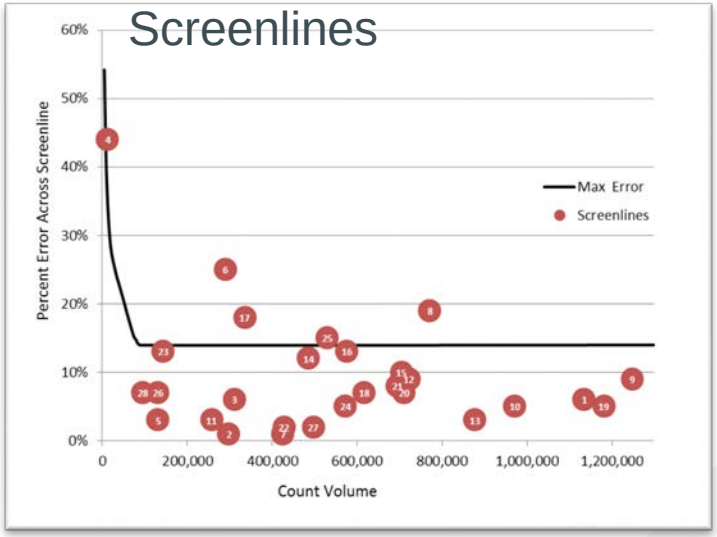
TABLE 6.10: % ROOT MEAN SQUARE ERROR BY VOLUME GROUP

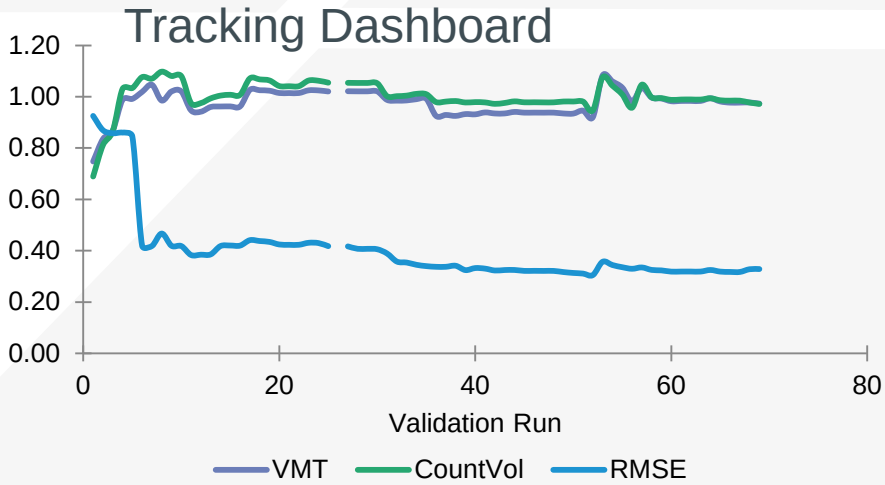
Low	High	Mid-Point	Number of Counts	% RMSE
0	5,000	2,500	75	74%
5,000	10,000	7,500	71	32%
10,000	20,000	15,000	26	22%
20,000	30,000	25,000	8	23%
30,000	40,000	35,000	7	7%
40,000	50,000	45,000	2	16%

Other Examples









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