

Avoiding Last-minute HPMS QC Before the Deadline

HPMS Data Quality Discovery with Ease and Velocity

Bo Guo, PhD, PE



Why LRS QC is Challenging?

LRS data structure is not as complicated

LRS data volume is not as massive

LRS data is not as dynamic



Any Suggestions?

Data silos?



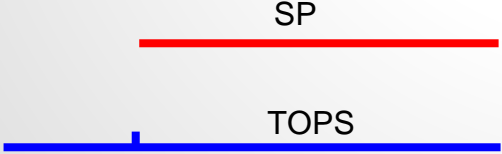
Spatial?

Dependencies?

Complicated rules?




HPMS QC Rules Summary

Rule Category	Illustration	General Description
Route Geometry		See FHWA's Route Check List
Event Topology	 <p>The illustration shows a horizontal grey bar labeled 'route' at its right end. Above it, a shorter red bar labeled 'event' is positioned, starting and ending within the span of the grey bar.</p>	Events fall within the route extents to which they belong
	 <p>The illustration shows two horizontal bars representing AADT data items. The top bar is red and labeled 'AADT' above it. The bottom bar is blue and also labeled 'AADT' above it. The two bars overlap in the middle, indicating that events from different data items should not overlap.</p>	Events from a data item should not overlap
	 <p>The illustration shows two horizontal bars. The top bar is red and labeled 'SP' above it. The bottom bar is blue and labeled 'TOPS' above it. A small vertical tick mark is placed on the blue bar, indicating that a sample panel (SP) is a subset of the TOPS extent.</p>	Sample Panels should be a subset of TOPS



HPMS QC Rules Summary

Category	Sub Category	Description
Business	Format	FHWA's format specifications
	Coverage	All required data items be included
		Events from a data item should cover their required extent
	Domain	Domain restrictions for item values in numeric or text or date fields
	Cross-check	Validate against a typical value range or related data items
	Statistic	Sample adequacy and compliance



SAD - Separation Anxiety Disorder!

SAD is genetic!

LRS event layer and LRS network

LRS event layers



Treatment of SAD?




HPMS QC Rules Approaches

Rule Category	Approach	Description
Route Geometry	GIS	See FHWA's Route Check List
Event Topology	Join	Events fall within the route extents to which they belong
	Join	Events from a data item should not overlap
	Join	Sample Panels should be a subset of TOPS

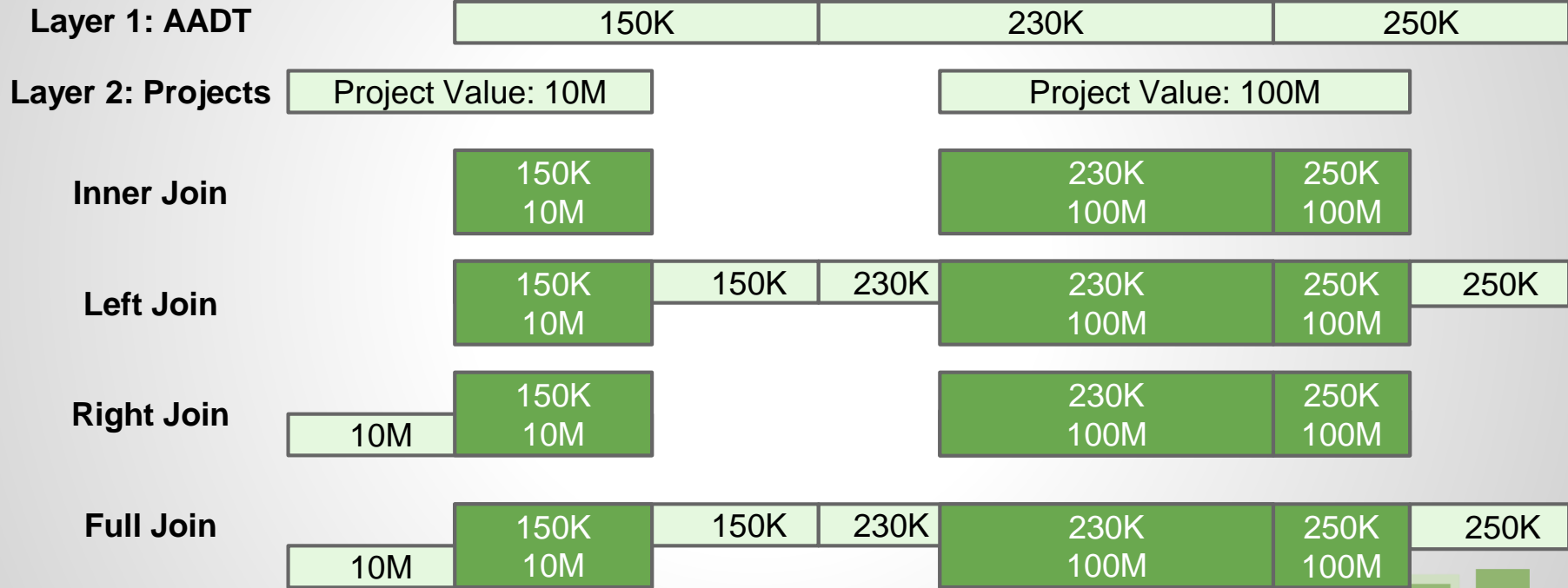


HPMS QC Rules & Approaches

Category	Approach	Description
Business	DB	FHWA's format specifications
	DB	All required data items be included
	Join	Events from a data item should cover the required extent
	DB	Domain restrictions for item values in numeric or text or date fields
	DB	Validate against a typical value range or related data items
	Statistic	Sample adequacy and compliance



LRS Join Types



An LRS Join Engine That

Takes Any number of layers,

Takes Any 1D or 2D event types,

Supports All join types, and

Is suitable for OLTP as well as OLAP

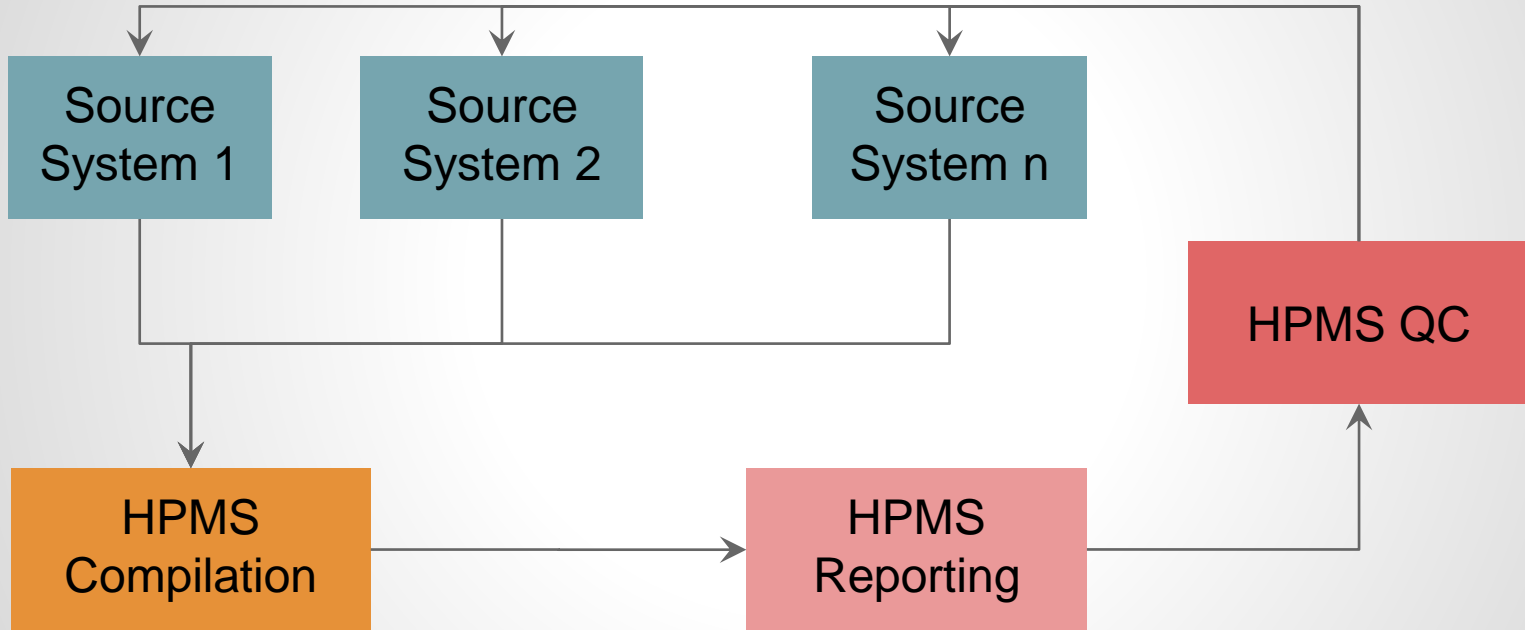


HPMS QC Agility Can Be Achieved...

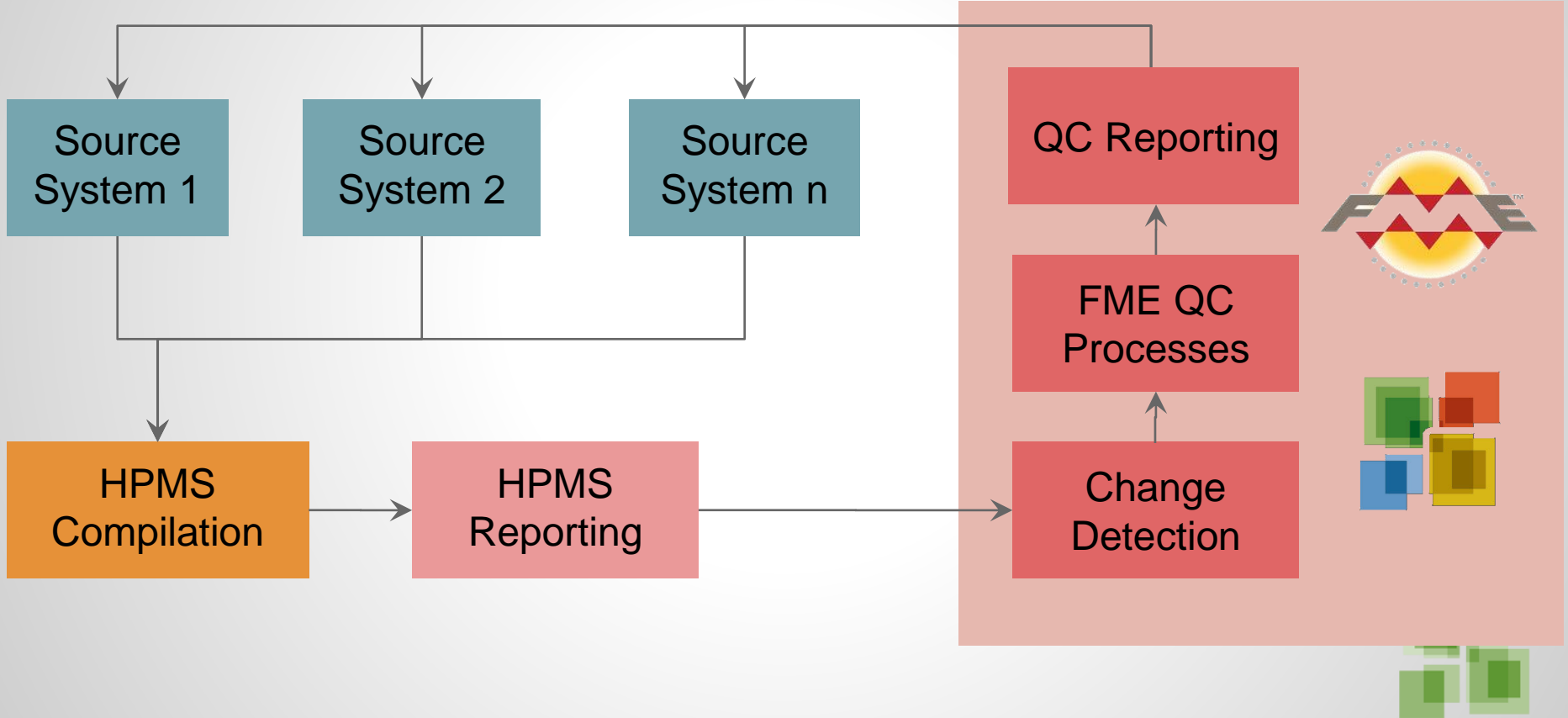
A sound HPMS process,
Supported by QC tool(s) that is
Comprehensive,
Easy-to-use,
Extendable, &
Non-proprietary



The Process & the Feedback Loop




The Process & the Feedback Loop



HPMS QC Tool Built on FME

Rule Category	FME Workspace
Route Geometry	HPMS_RouteGeomQCer
Event Topology	HPMS_EventTopoQCer
Business	HPMS_SectionsQCer
Statistics	HPMS_SampleStatQCer



LinearBench

Grid-based Segment Joint Algorithm

Performant

1-D & 2-D LRS

Off-the-shelf

Configurable



Resources

<https://gisticinc.com/category/blog/>



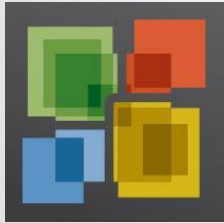
<https://www.youtube.com/user/linearbench>



<https://gisticinc.com/products>



Questions?



Bo GUO, PhD, PE

bo.guo@gisticinc.com

480-656-9962

gisticinc.com

