Federal Automotive Statistical Tool (FAST)

Preparing for Vehicle-level Data Reporting

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Topics

- **The evolving shape of fleet data**
- **Available resources**
- **What does VLD look like?**
- **How will VLD reporting work?**
- **Timeline**
- **Demo: Working with vehicle-level data in FAST**
- **Discussion / Q&A**

Changing Shape: Old

Section I – by vehicle type, size, engine configuration

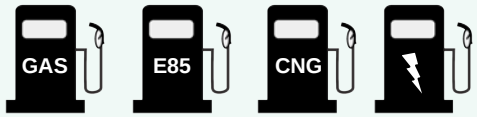
•Current year inventory, acquisitions

Section II – by vehicle class, ownership

•Lease Costs
•Maintenance Costs
•Indirect Costs
•Depreciation
•Mileage

Section III – by fuel type

•Fuel consumption
•Fuel cost



Changing Shape: New

V-ID

- Vehicle Type
- Engine Configuration
- Acquisition Date
- Disposal Date
- etc.

- Lease Costs
- Maintenance Costs
- Indirect Costs
- Depreciation
- Mileage

- Fuel Consumption
- Fuel Cost

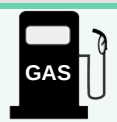
- Fuel Consumption
- Fuel Cost

V-ID

- Vehicle Type
- Engine Configuration
- Acquisition Date
- Disposal Date
- etc.

- Lease Costs
- Maintenance Costs
- Indirect Costs
- Depreciation
- Mileage

- Fuel Consumption
- Fuel Cost



Where Do You Start?

- **Understand the available resources**
  - Data Element Reference: *What data?*
  - Business Rules Reference: *What is valid?*
  - XML Schema: *How is data structured and formatted?*
  - Excel Import Template: *Alternate data format (with caveats!)*

- **Keep up with changes**
  - Current versions of all resources: https://fastweb.inl.gov/help/index.cfm/resources/vehicle-level-data
  - FAST "what's new?"
  - FAST emails to agency POCs
  - @FASTdevs

- **Make a plan**
  - Data (including systems)
  - People and processes
  - Testing

Resources: Data Element Reference

- **Defines *what* will be collected for each vehicle**
- **Understanding the elements is crucial!**
- **New data to be collected:**
  - Make / Model / Year
  - GVWR
  - Vehicle Assignment Type
  - Reason for Disposal
  - Capitalization Designation
  - Salvage %
  - Useful Life
  - Accident Repair Costs

Resources: Data Element Reference

- **Elements grouped by section**
  - Fleet information (4 elements)
  - Vehicle-level data
    - Vehicle attributes (15)
    - Ownership information (5)
    - Special characteristics & exemptions (8)
    - Operational & cost data (12)
    - Fuel consumption & cost data (6)
  - Out-year projections
    - Acquisitions & disposals (13, 14)
    - Fleet cost projections (7)

- **Each element described with**
  - Identifier
  - Name
  - Type / format
  - Description

Resources: Data Element Reference

Element Identifier | Name | Type | Description

Per-Vehicle Information			
Vehicle Attributes			
Identifier	Element Name	Type/Format	Description
A-1	Unique Vehicle Identifier	Text	Any identifier--vehicle information number (VIN), asset identifier, or other--that is unique within the agency (i.e., cannot ever be reused within the agency), is permanent (i.e., cannot ever change for a given vehicle), and avoids potential security concerns.
A-2	Make	Defined List	Vehicle manufacturer.
A-3	Model	Text	Vehicle manufacturer's model name.
A-4	Model Year	Numeric	Vehicle manufacturer's model year.
A-5	GVWR	Numeric	Gross vehicle weight rating (lbs).
A-6	Vehicle Type	Defined List	FAST vehicle type designation (e.g., "Sedan/St Wgn Compact").
A-7	Vehicle Fuel Type/Configuration	Defined List	Engine configuration and type(s) of fuel the vehicle is capable of consuming.
A-8	Garage - Domestic	Defined List	Indicates whether vehicle is located in an area considered to be domestic (as opposed to foreign) for FAST reporting.

Resources: Business Rules Reference

- **Defines what constitutes valid & reasonable data**
- **Identifies acceptable values for all data elements**
  - Type, content, size
  - Ranges of values
  - Lists of acceptable values
  - Inter-relationships with / dependencies on other elements
- **Two types of validation rules: blocking vs. flagging**
  - Blocking rules: prevent data from loading
  - Flagging rules: identify suspect data
- **Rules will evolve**
  - Ranges (e.g., costs) will change
  - Additional options (e.g., fuel types, fuel configurations)
  - Feedback from agencies

Technical Resources: Business Rule Reference

Element Name

Rule Description

Element Identifier

Rule Identifier

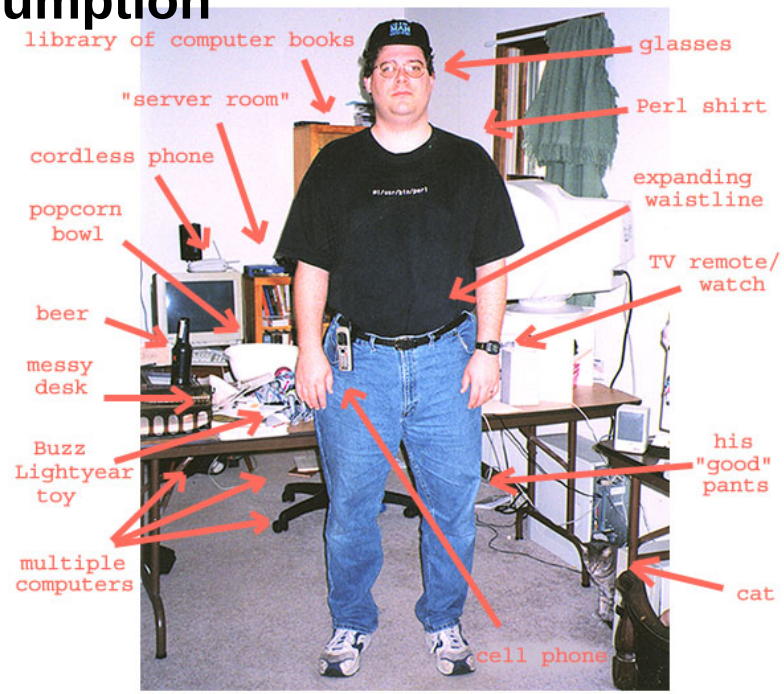
Rule Type

OW-1	Acquisition Date	OW-1.1	Type: date in XML-standard YYYY-MM-DD format	Block
		OW-1.2	Must be a valid date on or prior to the end of the report year for which data is being submitted	Block
		OW-1.3	Vehicles with acquisition dates in the report year for which data is being submitted should not be present in previous year's submissions	Flag
		OW-1.4	Vehicles with acquisition dates in previous report years should also be present in previous year's submission (with exception for agency in first year of VLD reporting)	Flag
OW-2	Ownership Type	OW-2.1	Type: enumeration; must match one of the following values: AO (Agency-owned) CL-D (Commercial dry lease) CL-W (Commercial wet lease) GL-D (General Services Administration [GSA] dry lease) GL-W (GSA wet lease)	Block

Technical Resources: XML Schema

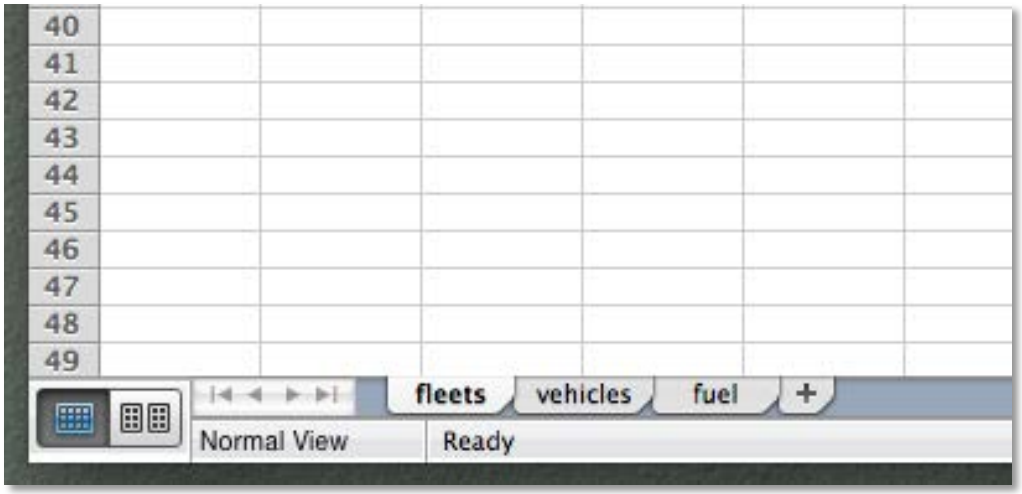
- **Schema: structured syntax definition**
  - Specific data format your MIS must produce
  - Tools available to validate XML

- **XML: not intended for human consumption**
  - … or production



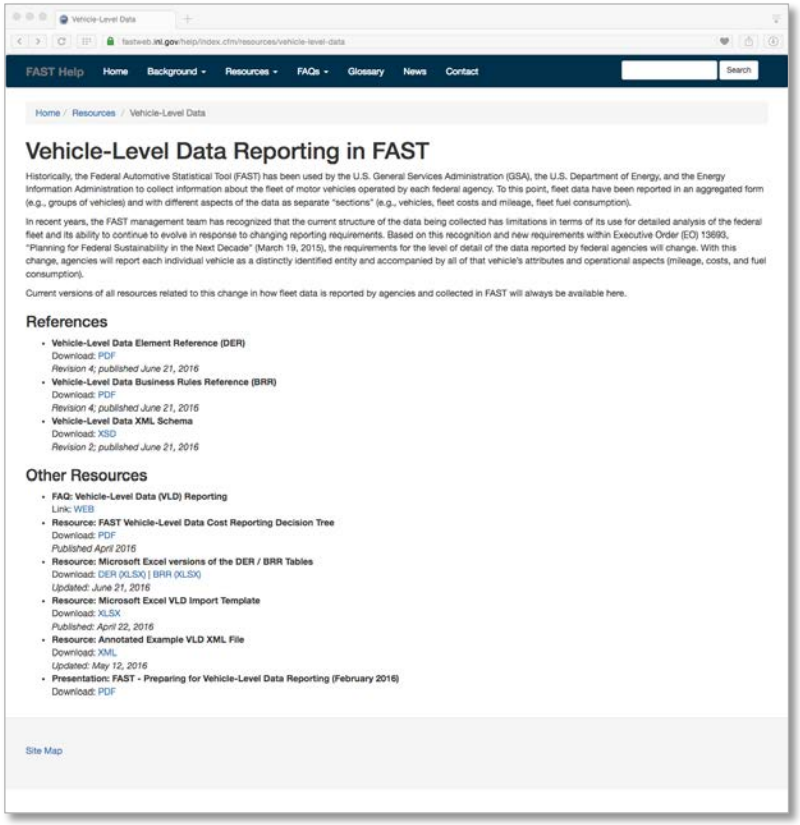
Technical Resources: Excel Import Template

- **Limitations:**
  - Not as scalable as XML
  - Will likely require manual effort
  - Subset of coverage of XML
- **May make short-term sense in some scenarios**
  - Data in multiple systems
  - Delay in MIS ability to generate XML



Resources: FAST Help

- **Links to current versions of all VLD resources**
  - Data element reference
  - Business rules reference
  - XML Schema
  - Excel import template
  - FAQ
  - Cost reporting decision tree
  - Example XML file
  - VLD-related presentations



Vehicle-Level Data

fastweb.inl.gov/help/index.cfm/resources/vehicle-level-data

FAST Help | Home | Background | Resources | FAQs | Glossary | News | Contact | Search

Home / Resources / Vehicle-Level Data

Vehicle-Level Data Reporting in FAST

Historically, the Federal Automotive Statistical Tool (FAST) has been used by the U.S. General Services Administration (GSA), the U.S. Department of Energy, and the Energy Information Administration to collect information about the fleet of motor vehicles operated by each federal agency. To this point, fleet data have been reported in an aggregated form (e.g., groups of vehicles) and with different aspects of the data as separate "sections" (e.g., vehicles, fleet costs and mileage, fleet fuel consumption).

In recent years, the FAST management team has recognized that the current structure of the data being collected has limitations in terms of its use for detailed analysis of the federal fleet and its ability to continue to evolve in response to changing reporting requirements. Based on this recognition and new requirements within Executive Order (EO) 13693, "Planning for Federal Sustainability in the Next Decade" (March 19, 2015), the requirements for the level of detail of the data reported by federal agencies will change. With this change, agencies will report each individual vehicle as a distinctly identified entity and accompanied by all of that vehicle's attributes and operational aspects (mileage, costs, and fuel consumption).

Current versions of all resources related to this change in how fleet data is reported by agencies and collected in FAST will always be available here.

References

- **Vehicle-Level Data Element Reference (DER)**
  Download: PDF
  Revision 4; published June 21, 2016
- **Vehicle-Level Data Business Rules Reference (BRR)**
  Download: PDF
  Revision 4; published June 21, 2016
- **Vehicle-Level Data XML Schema**
  Download: XSD
  Revision 2; published June 21, 2016

Other Resources

- **FAQ: Vehicle-Level Data (VLD) Reporting**
  Link: WEB
- **Resource: FAST Vehicle-Level Data Cost Reporting Decision Tree**
  Download: PDF
  Published April 2016
- **Resource: Microsoft Excel versions of the DER / BRR Tables**
  Download: DER (XLSX) | BRR (XLSX)
  Updated: June 21, 2016
- **Resource: Microsoft Excel VLD Import Template**
  Download: XLSX
  Published: April 22, 2016
- **Resource: Annotated Example VLD XML File**
  Download: XML
  Updated: May 12, 2016
- **Presentation: FAST - Preparing for Vehicle-Level Data Reporting (February 2016)**
  Download: PDF

Site Map

URL: https://fastweb.inl.gov/help/index.cfm/resources/vehicle-level-data

What does VLD look like?


```
<?xml version="1.0" encoding="utf-8" ?> <fv:fast-vld xmlns:fv="https://fastweb.inl.gov/xml/fast-
vld" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:schemaLocation="https://
fastweb.inl.gov/xml/fast-vld https://fastweb.inl.gov/xml/fast-vld.xsd" > <processing-directives
year="2016" data-handling="PURGE" /> <fleet abbrev="Z-VLDA" poc-name="D'weezil-Moonunit Q.
O'Zappa" poc-email="ron.stewart@inl.gov" id="zappa-vlda" comment="ZAPPA - VLD Test Fleet A" >
<vehicle vid="5NPDH4AE4DH373532" make="HYUNDAI" model="ELANTRA" year="2013" gvwr="3900" veh-
type="SEDAN/ST WGN SUBCOMPACT" fuel="GAS DE" loc-zip="90245" epact-701="EX" eisa-141="YES" acq-
date=" 2013-07-30" own-type="GL-W" assign="POOL" miles="4732" cost-lease="3653" cost-maint="0"
cost-accident="0" cost-indirect="468" id="zappa-hq:1" comment="Test vehicle 1" > <fuel loc="CA"
type="GAS" unit="GAL" vol="206" cost="0" id="zappa-hq:1:1" comment="Test Vehicle 1/Fuel 1" />
<fuel loc="NV" type="GAS" unit="GAL" vol="19" cost="0" id="zappa-hq:1:2" comment="Test Vehicle 1/
Fuel 2" /> </vehicle> <vehicle vid="5NPDH4AE3DH374607" make="HYUNDAI" model="ELANTRA" year="2013"
gvwr="3900" veh-type="SEDAN/ST WGN SUBCOMPACT" fuel="GAS DE" loc-dom="YES" loc-withheld="NO" loc-
zip="90245" epact="DEFAULT" epact-701="EX" eisa-141="YES" eo-13693="DEFAULT" lghg-afv="NO" le="NO"
er="NO" armored="NO" acq-date="2013-05-16" acq-cost="0" own-type="GL-W" assign="POOL" cap="N/A"
salvage-pct="0" depr="0" miles="2863" cost-lease="3804" cost-maint="0" cost-accident="0" cost-
indirect="468" bec="ZAPPA" asf="" id="zappa-hq:2" comment="Test vehicle 2" > <fuel loc="CA"
type="GAS" unit="GAL" vol="97" cost="0" id="zappa-hq:2:1" comment="Test Vehicle 2/Fuel 1" /> <fuel
loc="AZ" type="GAS" unit="GAL" vol="43" cost="0" id="zappa-hq:2:2" comment="Test Vehicle 2/Fuel
2" /> </vehicle> <vehicle vid="JTECJ09J505509117" make="TOYOTA" model="LAND CRUISER" year="2003"
gvwr="6900" veh-type="LD SUV 4X4" fuel="DSL DE" loc-dom="NO" epact-701="EX" eisa-141="FOR" acq-
date="2004-02-01" own-type="AO" assign="POOL" cap="YES" salvage-pct="10" life="72" depr="27000"
miles="39504" cost-maint="459" cost-accident="0" cost-indirect="390" disp-date="2016-07-13" disp-
reason="AO-DONATION" disp-cost="0" disp-proceeds="0" bec="" asf="" id="zappa-hq:3" comment="Test
vehicle 3: Very high mileage; donated to local NGO" > <fuel loc="FO" type="DSL" unit="GAL"
vol="2079" cost="8566" id="zappa-hq:3:1" comment="Test Vehicle 3/Fuel 1" /> <fuel loc="FO"
type="DSL" unit="GGE" vol="1234" cost="2468" id="zappa-hq:3:2" /> <fuel loc="FO" type="DSL"
unit="KWH" vol="1000" cost="23" id="zappa-hq:3:3" /> </vehicle> <projections> <acquisitions
fy="2017" own-type="GL" veh-type="SEDAN/ST WGN SUBCOMPACT" fuel="GAS DE" qty="4" id="zappa-hq:a:
1" /> <acquisitions fy="2018" own-type="GL" veh-type="SEDAN/ST WGN SUBCOMPACT" fuel="GAS/E85 FF”
```

What does VLD look like?

Prolog: identifies it as FAST VLD XML

```
<?xml version="1.0" encoding="utf-8" ?>
<fv:fast-vld
   xmlns:fv="https://fastweb.inl.gov/xml/fast-vld"
   xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
   xsi:schemaLocation=
     "https://fastweb.inl.gov/xml/fast-vld https://fastweb.inl.gov/xml/fast-vld.xsd"
   >
   <processing-directives … />
   <fleet … >
      <vehicle … >
         <fuel … />
         <fuel … />
         …
      </vehicle>
      …
   </fleet>
   …
</fv:fast-vld>
```

What does VLD look like?

Processing Directives: how to work with this XML file

```
<fv:fast-vld … >
   <processing-directives
      year="2016"
      process="IMPORT|VALIDATE-ONLY"
      existing-data-handling="PURGE|APPEND-FAIL-IF-DUPES|APPEND-REPLACE-DUPES"
   />
   <fleet … >
      <vehicle … >
         <fuel … />
         <fuel … />
         …
      </vehicle>
      …
   </fleet>
   …
</fv:fast-vld>
```

What does VLD look like?

```
<fv:fast-vld … >
   <processing-directives … />
   <fleet abbrev="INL-BEA" poc-name="Tad Pearson" poc-email="…" … >
      <vehicle … >
         <fuel … />
         <fuel … />
         …
      </vehicle>
      …
   </fleet>
   <fleet abbrev="INL-CWI" poc-name="Terry Montague" poc-email="…" … >
      <vehicle …>
      </vehicle>
      …
   </fleet>
   …
</fv:fast-vld>
```

Fleet(s): linkage to FAST reporting hierarchy for groups of vehicles

What does VLD look like?

```
<fv:fast-vld … >
   <processing-directives … />
   <fleet abbrev="INL-BEA" … >
      <vehicle vid="5NPDH4AE4DH373532" make="HYUNDAI" model="ELANTRA" year="2013"
         gvwr="3900" veh-type="SEDAN/ST WGN SUBCOMPACT" fuel="GAS DE"
         loc-zip="90245"
         epact-701="EX" eisa-141="YES"
         acq-date="2013-07-30"
         own-type="GL-W" assign="POOL"
         miles="4732"
         cost-lease="3653" cost-maint="0" cost-accident="0" cost-indirect="468"
         … >
         <fuel loc="CA" type="GAS" unit="GAL" vol="206" cost="0" … />
         <fuel loc="NV" type="GAS" unit="GAL" vol="19" cost="0"  … />
         …
      </vehicle>
      …
```

Vehicle(s): All attributes of one vehicle

Fuel(s): All fuel cost and consumption entries for this vehicle

XML Considerations

- **Understand defaults and optional values**
  - Can simplify XML generation
  - `<vehicle … >` element has 26 attributes that are
    - … optional, or
    - … have defaults, or
    - … can be omitted in certain circumstances
    - Example: vehicles default to domestic, if not specified
  - Study the Business Rules Reference and the XML schema!

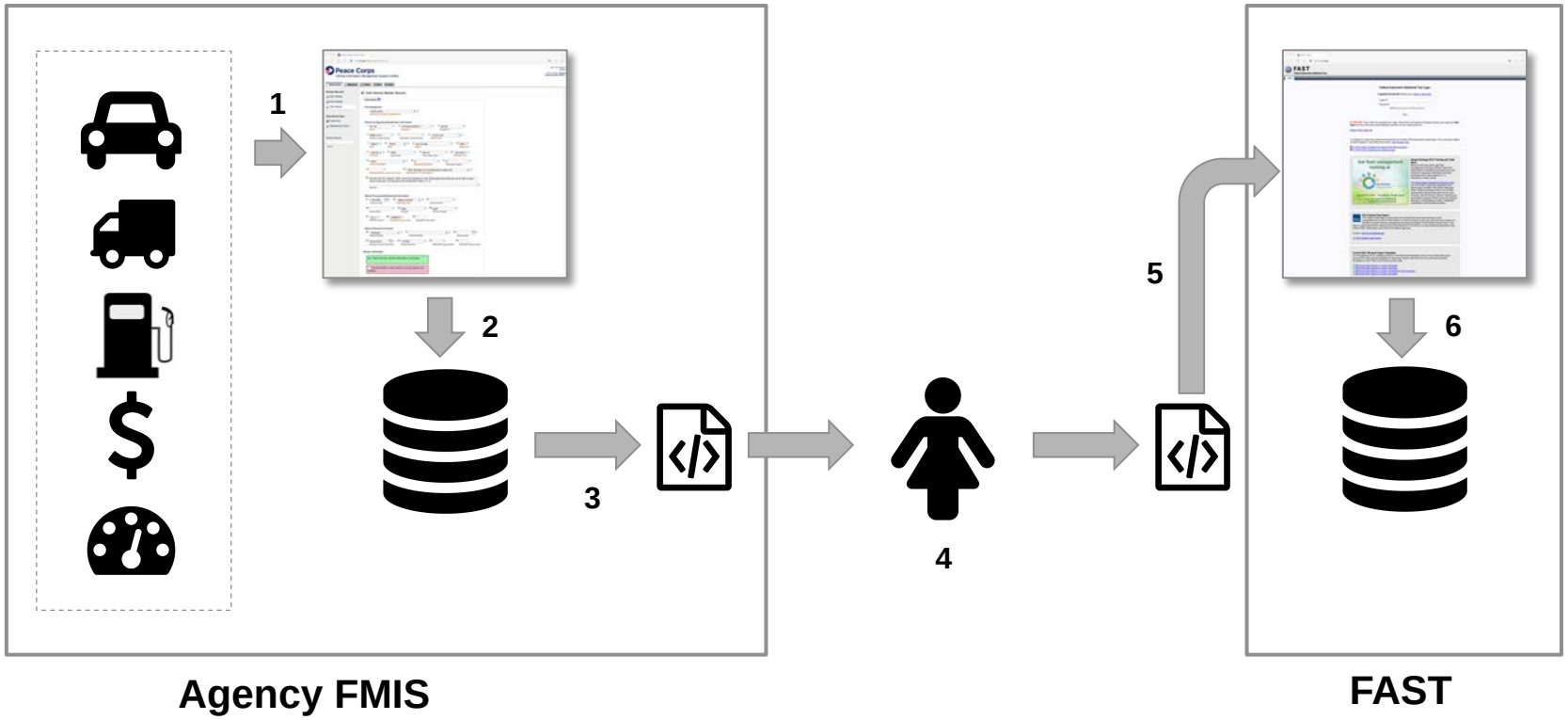
- **How will you use `<vehicle … asf="…" … >` ?**
  - Optional agency sort/filter field
  - Include agency-specific attributes to group / filter vehicles

XML Considerations

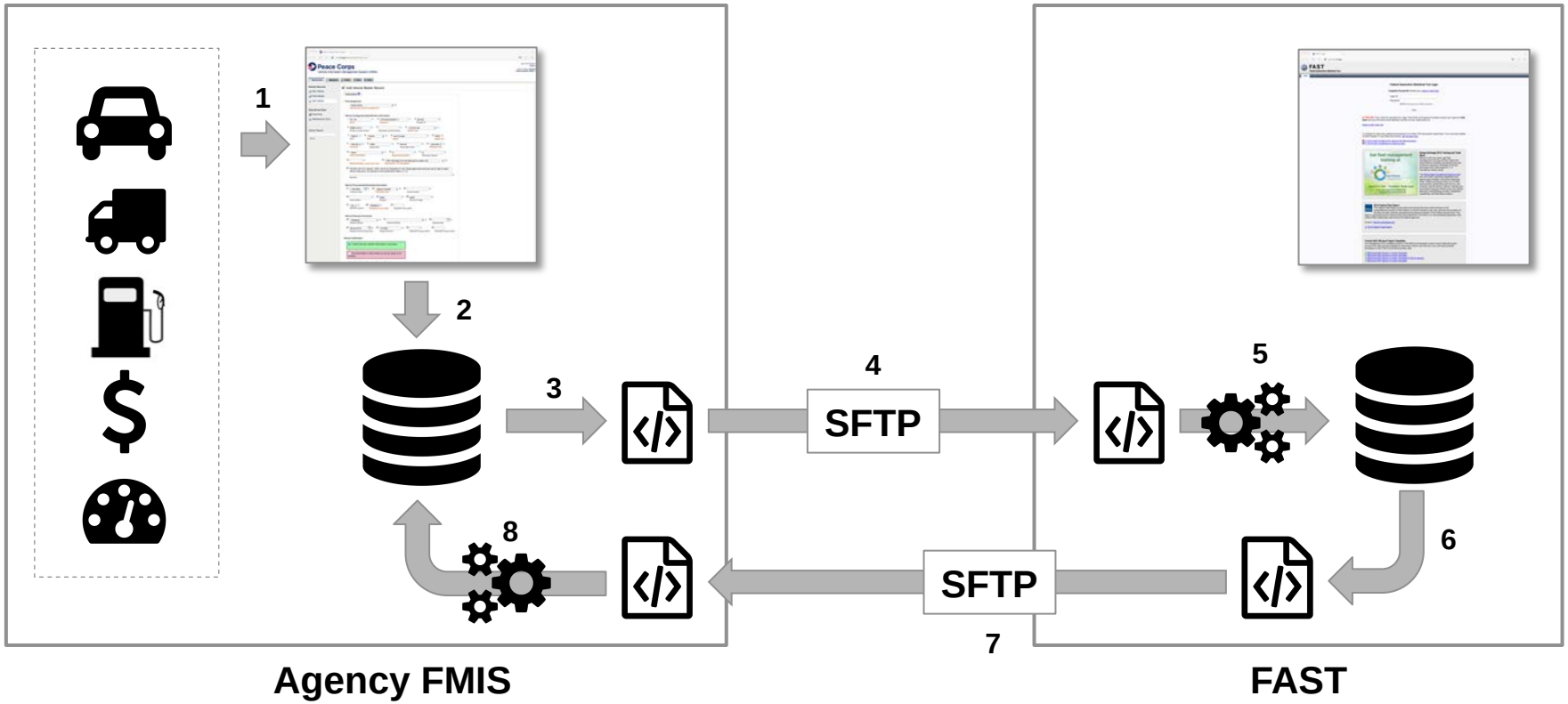
- **All XML elements support two *optional* attributes:**
  - **`id`**: arbitrary element identifier
    - Valuable for trouble-shooting (e.g., FMIS record IDs)
    - Can be included in most validation diagnostics
  - **`comment`**: arbitrary text to accompany information
    - A form of embedded documentation
    - Retained for **`vehicle`** XML elements

```
…
<vehicle … id="MIS:FD8C7B22-E681" comment="Source:VMIS; tag:ID 8BCE518">
   <fuel … id="MIS:35F602B5-7110" />
   <fuel … id="MIS:90677F82-47B3" />
</vehicle>
…
```

Mechanics of reporting: manual process



Mechanics of reporting: automated process



Demo: Working with VLD in FAST

Linkages: Fleet MIS ←→ FAST

- **Fleet abbreviations**
  - Crucial, particularly *if* you retain hierarchy with VLD
  - Must be specified & unique in FAST

- **Vehicle identifiers**
  - Tie individual vehicle in FMIS to vehicle in FAST
  - Must be unique *and* permanent
  - Should be visible in FMIS

- **Agency budget element codes**
  - Relevant only to agencies submitting multiple OMB A-11's
  - Ties each vehicle to portion of budget
  - Talk to us!

Linkages: Fleet MIS ←→ FAST

- **Web services / API: your FMIS may be able to talk to FAST**
  - … to ask for information (e.g., lists of allowed values)
  - … to do stuff (e.g., validate a vehicle)

- **More on this during FY 2017**

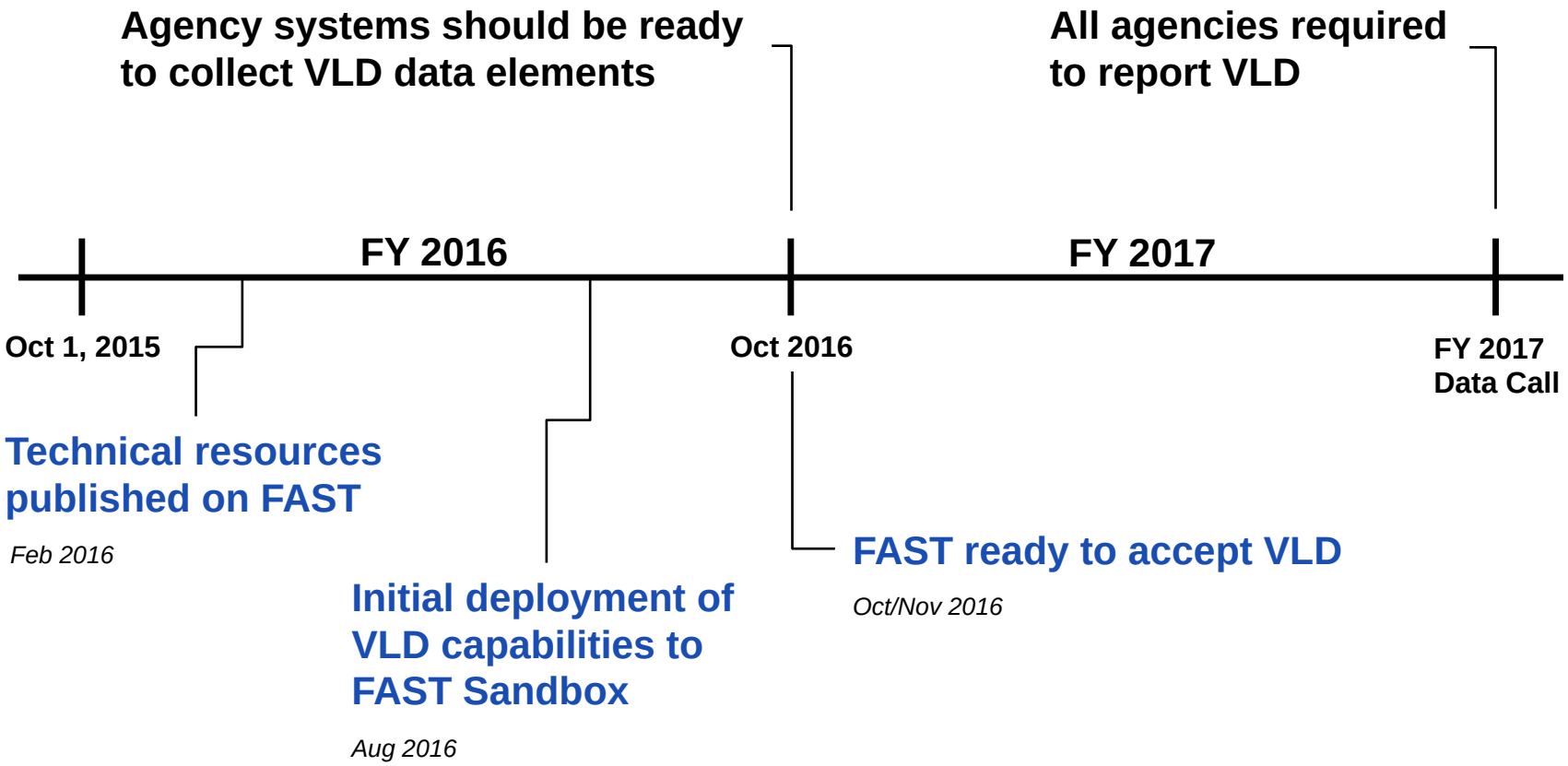
Recommendations

- **Hierarchy**
  - As simple as possible
  - Retain structure only where needed
  - Determine approach early
  - Account for OMB A-11 submission, too

- **Reporting process**
  - Manual for the first couple iterations
  - … *then* evaluate move to automated process

- **Validation: early and often**
  - Incorporate business rules into FMIS?
  - Use FAST Sandbox and “validate-only” processing
  - Verify information in FMIS vs. FAST

Timeline


Agency systems should be ready to collect VLD data elements
All agencies required to report VLD
FY 2016
FY 2017
Oct 1, 2015
Oct 2016
FY 2017 Data Call
Technical resources published on FAST
Feb 2016
Initial deployment of VLD capabilities to FAST Sandbox
Aug 2016
FAST ready to accept VLD
Oct/Nov 2016

Discussion

Q & A

FAST Program Contacts

- **GSA Office of Governmentwide Policy**
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  - Ed Lawler (ed.lawler@gsa.gov, 202-501-3354)
  - Karl Wolfe (karl.wolfe@gsa.gov, 202-219-0446)

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