VSS Working Sessions

COVESIA AMM

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VSS Working Session

• Part 1
  – Walk through and discussion of recently presented VSS improvement areas
    ▪ Based on presentations from Ford and Blackberry

• Part 2
  – VSS catalog evolvement
    ▪ What to add, what to remove, ...
  – VSS format and tooling
    ▪ What changes do we see as wanted/needed?
    ▪ What shall we NOT change

This is supposed to be an interactive session – please interrupt!
Typical workflow of a successful change to VSS

• Someone presents an idea
  – Creates an issue in VSS Github explaining the idea or problem area
  – Presents it at a VSS meeting
• We agree that the idea is good (or at least acceptable)
  – First discussed in Github and VSS Meetings
  – If needed also discussed/decided in DEG, TST, Board
• Someone volunteer to drive development
  – Creates more detailed proposals, possibly including prototypes
  – Propose time plan and acceptance criteria
  – Implements and creates Pull Requests
• Pull Requests reviewed and discussed by VSS meetings
  – When approved merged by VSS Maintainers (individuals with merge rights, typically Erik/Adnan/Sebastian)
  – Change included in next minor and/or major-release
VSS Type Representation

• VSS Today
  − Type of a signal is implicitly given by a combination of datatype/unit/min/max/allowed
  − “Type” reuse only possible for structs

• Idea presented
  − Define reusable properties

```json
AmbientAirTemperature:
id: AmbientAirTemperature
name: Ambient Air Temperature
schemaElementType: DataProperty
definition: The temperature of the air in a site or spatial region
datatype: DataTypeSpecification.float
unit: Celsius

Temperature:
datatype: int8
type: actuator
unit: celsius
description: Temperature
definition: The degree or intensity of heat set for a HVAC station
schemaElementType: Signal
signalName: Vehicle.Cabin.HVAC.Station.Temperature
propertyId: AmbientAirTemperature
objectId: Vehicle.Cabin.HVAC.Station
```
**VSS Type Representation**

- **Pros/Cons**
  - Makes VSS model somewhat more complex
  - Fits quite well into the type concept we already have for structs
  - Could help keeping VSS standard catalog consistent
    - Avoid that similar signals have different type/unit
    - "All temperature signals shall use TemperatureCelsius property!"

- **Possible VSS Solutions**
  - Extend existing type/struct syntax for this purpose
  - Convert existing signals to use properties
  - Tools must be modified – Are two flavors needed, one that keep property information and one that expand/replace property information to keep backward compatibility?

- **Discussion** – What is your opinion?
Tree vs Flat Structure

- **VSS Today**
  - One Root
  - Branches more or less used as namespaces
  - No real distinction between classes and objects

- **Ford Idea (our interpretation)**
  - No real requirement to have a tree
  - We may have “hierarchical dot notated names” but not necessarily
  - It is up to the child to declare it’s father rather than opposite

- **Related comments**
  - We have previously got comments that VSS expanded name are too long for some environments where identifiers have a max length.
Tree vs Flat Structure continued

• Implications and Discussion Topics
  – This would be a big change if performed in *.vspec files
    ▪ And if so, a good point in time to discuss if *.vspec shall be kept as source format
  – Generating “old style” expanded Yaml/JSON from new format doable, if needed
  – Even if we “scrap” branches – do we still some need some namespace mechanism and support for relative addressing?
• Discussion – What is your opinion?
Instances

- VSS Today
  - Instances defined on branch
  - Syntax limited, basically enum and/or array
- Ford Idea (our interpretation)
  - You define objects instead of specifying instances in the class
  - Arbitrary Identifier, not necessarily following VSS “expanded names”
  - Possibility to define static object data
    - Like “LateralPosition” in image
- Related comments
  - Some downstream projects like Eclipse Velocitas prefer to work with unexpanded paths to allow methods like “getHVAC(row,pos)”
Instances continued

• Implications and Discussion Topics
  − Instances is common discussion point for VSS
  − The current style forces us to have “default size” for number of doors/seats/HVACs as you MUST specify instances at standard catalog level
  − Current VSS solution has some possibility to add signals for a specific instance by overlays specified by expanded name. Would require a different solution if using this syntax (class inheritance to allow addition of signals?)
  − Do we need a special mechanism to specify that “LateralPosition” is a “const signal/attribute” of HVACStation, i.e. something that must be given when instantiating, i.e. something that an SDK can use to find a matching HVAC station?
• Discussion – What is your opinion?
Signal type

• VSS today
  - Signals are specified as attribute, sensor or actuator
  - These types are often confusing, as there may not be a real sensor behind, the value may be calculated
  - What a client can do may anyway be limited by access rights
  - But distinction may serve a purpose in deployments
    ▪ An actuator has both a current value and a wanted value, sensor/attribute has only current value

IsRecirculationActive:
- datatype: boolean
- type: actuator
- description: Is recirculation active.
  id: Vehicle.Cabin.HVAC.IsRecirculationActive
  name: Vehicle.Cabin.HVAC.IsRecirculationActive
  schemaElementType: Signal
  propertyId: IsActive
  objectId: Vehicle.Cabin.HVAC.Recirculation
  definition: Indicates whether the cabin air is being recirculated
  isDefinedBy: FordMotorCompany, COVESA
  definitionSource: VehicleSignalSpecification
Signal type - continued

• Implications and Discussion Topics
  – Some distinction may be useful
  – Example: Vehicle.Speed is never intended to be actuable (we think). Hood.IsOpen may be it in some vehicles
    • I.e. no value in that an API generate a “setTargetSpeed(float value)”
  – Ontology guys sometimes differentiate between Observable Properties and Actuable Properties
  – Does anyone make a distinction between attribute and sensor in their implementation?
• Discussion – What is your opinion?
Description/Definition

- Ford proposal
  - Replace “description” with “definition”
- VSS Today
  - No real definition exists on what should be part of “description”
- Implications and Discussion Topics
  - Is the purpose of the current “description” and the intended “definition” different?
  - I.e. is just “definition” a better name, or do we need both?
- Discussion – What is your opinion?

```json
IsRecirculationActive:
  - datatype: boolean
  - type: actuator
  - description: Is recirculation active.
  id: Vehicle.Cabin.HVAC.IsRecirculationActive
  name: Vehicle.Cabin.HVAC.IsRecirculationActive
  schemaElementType: Signal
  propertyId: IsActive
  objectId: Vehicle.Cabin.HVAC.Recirculation
  definition: Indicates whether the cabin air is being recycled
  isDefinedBy: FordMotorCompany, COVESA
  definitionSource: VehicleSignalSpecification
```
Permission Model

- **VSS Today**
  - Does not specify anything, not even a syntax
- **Implications and Discussion Topics**
  - Access rights can likely never be specified in VSS standard catalog
  - But we could specify “recommended methods” where we define syntax allowing VSS models to be annotated
  - We could extend tooling to check for consistency
- **Discussion** – What is your opinion?
UUID

- VSS Today
  - We have UUID based on path name, but method not well described
  - No method to use other UUID, a different UUID method or to reuse old UUIDs and map UUIDs

- Implications and Discussion Topics
  - What use cases do we intend to solve
    - Short identifiers to reduce message length?
    - Mapping signals with same content
    - Identify changes compared to standard VSS or compared to previous version
  - Do we think one method would suffice?
  - Or do we think it will be use-case dependent?

- Discussion – What is your opinion?
VSS Catalog evolvement – VSS History

- Focus on signals needed by “vehicle users”
  - infotainment, apps
  - Remote unlock, check fuel level, ...
- QM only, i.e. not intended for safety critical features
  - Primarily not intended for “zones”, at least not with a generic key-value-based solution like KUKSA or VISS
- Shall be vehicle focused, but may be intended for both off-board/on-board usage.
  - Example: Vehicle color may be totally irrelevant to store on-board, but is relevant in a vehicle database
- Aggregated data on fleet level is not within the scope of VSS
  - Example: Average distance between accidents
- Even if VSS use the terms “actuator” and “sensor”, they do not necessarily map to a physical sensor/actuator
  - Actuator: Something where a user can set a target value
    - Example: Vehicle.HVAC.Temperature
  - Sensor: Something that typically varies over time, but a user cannot set target value directly
    - Example: Vehicle.Speed
VSS Catalog – Trends and Change Methodology

• Most low hanging fruit already picked, signals are becoming more complex
  – Just studying an individual signal is not enough, you need to study some concept documentation
  – Examples: PowerOptimize, WiperSystem

• Smaller non-controversial changes
  – Just make a Pull Request

• Larger changes
  – Create Issue/PR for discussion
  – If needed, create a COVESA task group or project with members interested in this topic:
VSS Catalog – Recent discussions - OBD

• VSS has an OBD branch which often triggers discussion

• Arguments Against
  – VSS and VSS-implementations (like VISS, KUKSA) are likely not feasible to provide data on the OBD-II interface due to latency/frequency requirements
  – Many signals in the branch are duplicates of similar signals in other parts of the tree
  – VSS shall not include 1:1 copies of other standards

• Arguments For
  – OBD-tools are expensive, making data like Diagnostic Codes (DTC) available over VSS could be useful for vehicle owners, so they can view data in an App on their mobile phone

• One possible solution (which seems to be preferred/acceptable by many)
  – Remove OBD-branch
  – But first add relevant signals to other places in VSS Tree
    ▪ DTCs are frequently mentioned
    ▪ But are others of interest, like lambda sensor readings?

• Discussion – What is your opinion?
VSS Catalog – Other improvements Areas

• We recently had a PR addressing the “Driver branch”
  – Fatigue, Attentiveness, Eyes on road, ...
  – That branch appears to not be that mature, and if there are multiple parties interested this could be a candidate for a task force/sub-project to identify needed changes.

• Discussion – What other areas do you see where changes would be beneficial?
  – Any areas you would be interested in driving?
VSS Format and Tooling

- Current Python Tool-Chain
- Includes some variation points
  - With/Without UUID
  - Expansion of instances (or not)

```yaml
* .vspec (~Yaml)
#include

units.yaml
overlays.vspec

* .vspec (~Yaml)

*.vspec (~Yaml)
*.vspec (~Yaml)
.types.vspec

VSS-Tools

Syntax & Semantic Check
Expand Instances

JSON Exporter
CSV Exporter
...
...
...
Output Artifacts
```
VSS Format and Tooling

- The use of *.vspec (basically Yaml with some extensions) as source format is sometimes challenged
  - Does not fit that well with “ontology” representation, or the representation proposed by Ford
  - Limited out of the box support, like schema definition
- Some ideas presented would require major changes to VSS, i.e. if we think that we need some other source format now might be a good time to do it.
- We always strive to minimize amount of changes that are backward incompatible
  - But we do not really know what all downstream projects use as input
  - So difficult to say what the consequences would be
- Examples:
  - Eclipse KUKSA use JSON generated by vss-tools as input. As long as we can generate JSON that looks like today the actual VSS source format (today *.vspec) does not matter
- Two major approaches to support more complex models
  - Keep *.vspec as of today, annotate it if needed so that vss-tools can generate more complex model, for example generating classes/objects/properties
    ▪ Drawback: Makes tooling more complex
  - Replace *.vspec with “something else”. Derive *.vspec and/or current export results (CSV, JSON, …) from it.
    ▪ Drawback: Completely new tooling required
- What is important for you concerning VSS Format and Tools?