Arlinger John 22 April 2021

Minutes StanForD

2021-04-29

Place:	Microsoft Teams (Uppsala), 2021-04-21, 10:00-16:00 CET
Participants:	John Arlinger, Secretary Johan J. Möller, Chairman Josh Hildebrand, Tigercat Jacek Nawrot, Tigercat Juha Korhonen, Technion Heikki Komulainen, Ponsse Erik Kindlund, JohnDeere Antti Korkiakoski, JohnDeere Lars-Erik Andersson, Dasa Mikael Jakas, Logset Mike O'Shea, Coillte Andreas Barth, CGI Asko Leivonmäki, Exertus (Logset) Alexander Kaulen, KWF Pasi Palonen, Parker Tapio Räsänen, Metsäteho Christoph Ginet, FCBA Ronan O'Keefe, Coillte Sorsa Juha-Antti, Metsäteho Jonas Gustafsson, Sveaskog Marius Kopetzky, KWF Halvard Olderlund, Komatsu Henrik Persson, Logmax Ian Wilsson, PHD Forest Jeremy Gibson, PHD Forest Jacek Nawrot, Tigercat Jean Plamondon, FP Innovation Jonas Torsson, Dasa Lars Henriksson, Biometria Jyrki Vainio, Trimble (14:00-16:00)

Decision summary:

The following decisions will only affect the version 4.0 pre-release schemas:

- Decided to add the following new simple data types for common elements:
    - DiameterType = xsd:positiveInteger
    - VolumeType = nonNegativeDecimal
    - OrderType = xsd:positiveInteger
    - KeyType = xsd:unsignedLong
    - MassType = nonNegativeDecimal
    - LogLengthType = singleDigitNonNegativeDecimal

- Decided to modify the Tracking so that a message specific Tracking-type is implemented for each type of message.

- Decided to adjust StemCode registration per stem (in hpr, hqc and bpr). No attribute is included for keeping sticky and non-sticky codes apart.

- Decided to recommend that a possible "sticky stem code" is not de-activated unless operator selects another sticky stem code or manually de-activates the present sticky stem code. This means that the sticky code is not affected if a "individual stem code" is selected or if a new species group is selected. However, it was decided that "changing Object" must de-activate sticky stem code!

- Decided to add the following elements to ogi:
    - Extension elements to Feature, FeatureCollection, StyleDefinition, SymbolDefinition.
    - ModificationDate to FeatureCollection, StyleDefinition, SymbolDefinition.
    - FeatureCollectionInfo element to FeatureCollection
    - FeatureInfo element to Feature
    - SymbolUserID element to Warning

- Decided to let the secretary study how to register overlapping machine times in OperatorWorkTime before the next meeting.

- Decided with the minutes that:
    - OperatorLoginTime is replaced by the OperatorLogInEvent
    - IndividualMachineWorkTimeKey is added to IndividualMachineWorkTime.

- Decided to add a structure for registering LoadChange for each Load

- Decided that a separate meeting is to be held on the 28th of May to discuss new LimitationCategory further. Skogforsk, Metsäteho and Trimble to be invited by Metsäteho.
  It was decided to discuss this issue at the next meeting. It was suggested that a practical analysis is done (by Trimble) on the effects based on "real"

hpr-data. A real case example is probably needed in order to get a common understanding.

- Decided to reject or indefinitely postpone following issues:
    - Starting forwarding object using hpr, mandatory SubObjects, stricter implementation rules for 4.0

- Decided to postpone to next meeting:
    - BarkFunction, DiameterSection, fuel consumption in hpr, distribution bucking and MTP, Geo-fencing of objects and new GNSS precision elements

Action list (not updated since last meeting):

- The following guidelines should be observed when implementing LongTimberDefinition:
    - Must be possible to view and edit LongTimberDefinition in administrative tools.
    - Default value equal to DiameterMAXButt in administrative tools
    - LongLogButtMAX is never to be included in pin-file if value is 0 (it is optional).
    - Value 0 (zero) is to be interpreted as null.

- It is recommended to implement stem codes for both individual trees and groups of trees (so called "sticky registration of stem codes"). Whether the "sticky registration" is trigger by double click or any other operator interaction does not matter.

- Do not mix products and deliveries in forwarder applications.
    - Focus on Deliveries in the UI.
    - Avoid using pin-files. It often creates a lot of confusion.

- Map interface when creating Locations would be good to avoid incorrect coordinates.

- TextToMachine an urgent variable to be shown when creating new object in harvester and forwarder.

- It is strongly recommended that the control system does not automatically activate a modified pin if it is not active at the present harvesting object

- All randomly selected stems (both rejected and not rejected) must be saved in an hqc-file including a possible reason for rejection. This file should be possible to send directly to the forest company (in Sweden to Biometria).

- Coordinates in production files should always be activated by default in all forest machines (especially important after software updates when coordinate registration is commonly lost).

§1 Opening of meeting and agenda

Chairman Johan J Möller opened the meeting.

No "other issues" were added to the agenda.

§2 Presentation of participants

Presentation of meeting participants including a short report on the weather and the market for saw wood (all time high).

§3 Information about decisions and discussions at previous meetings

- It was decided to publish the new specification for StanForD REST API 1.0.

- It was decided to publishing new yarder and skidder schemas (soi/spr/yoi/ypr) within version 3.6.

DECISIONS MAJOR VERSION 4.0

The following decisions at previous meeting will affect the version 4.0 pre-release schemas:

- New simple type to be used for all UserIDs.

- New simple type for LogLengths to include a single fractional digit.

- The xml data type "xsd:unsignedLong" is to be used for all keys (from 0 up to 18446744073709551615).

- Reject the proposal for new Tracking structure and to keep the present layout. The secretary will analyse how to handle Tracking in order to do schema specific adjustments (e.g. fpr vs mom as illustrated in proposal.

- Update the diameter vector.

- Keep StemType structures in pin and spi as it is without any changes.

- Update the StemCode structures for both stem and species group. Also decided that the secretary will clarify rules for handling sticky stem codes.

- Modify the ogi schema including use of a GeoJson string inside element MultiPoint/MultiLine/MultiPolygonGeoJson and to add a new schema called DesignTemplate.

- Exclude combined times and frequency short down times from mom and to develop a new schema for distributing user defined codes for down times and other work.

- exclude combined times and frequency short down times in mom.
- develop a new schema for distributing user defined down time codes
- exclude ShiftKey from the IndividualMachineWorkTime and to discuss how Shift, OperatorWorkTime, Login and MachineWorkTime are related to each other at the next meeting.

§4 Proposals new major version 4.0

NEW SIMPLE DATA TYPES

It has been discussed (proposal by Henrik Persson) to study the possibility of implementing new simple types for handling commonly register data categories such as Diameters, Volumes, Keys (numerical), PresentationOrders etc.

It was decided at the previous meeting that the secretary will look for other elements/attributes used repeatably for the same type of measurements, like volumes per log, volume per load, volume per stem etc. Having common simple types simplifies maintaining the standard in the future.

<u>Decided</u> to add the following new simple data types for some common elements:

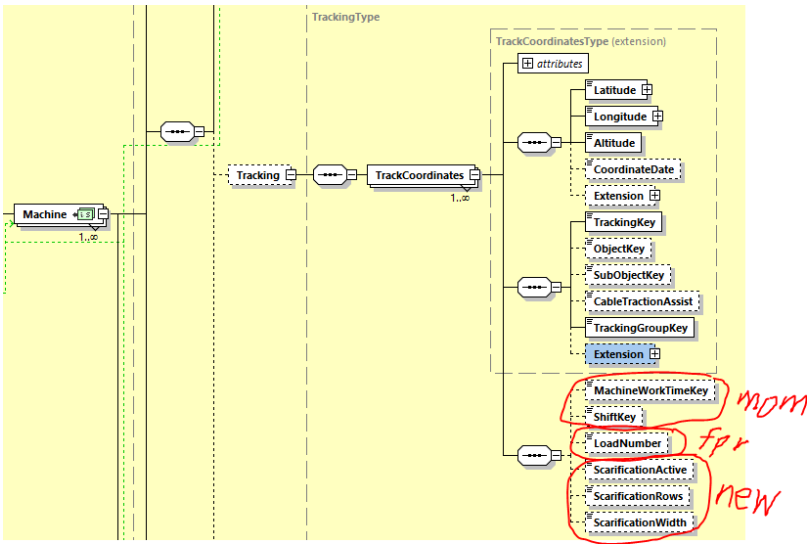
- Diameters/DBH → DiameterType = xsd:positiveInteger
- Volumes → VolumeType = nonNegativeDecimal
- Presentation/Order → OrderType = xsd:positiveInteger
- Keys → KeyType = xsd:unsignedLong
- Mass → MassType = nonNegativeDecimal
- LogLengths → LogLengthType = singleDigitNonNegativeDecimal

TRACKING

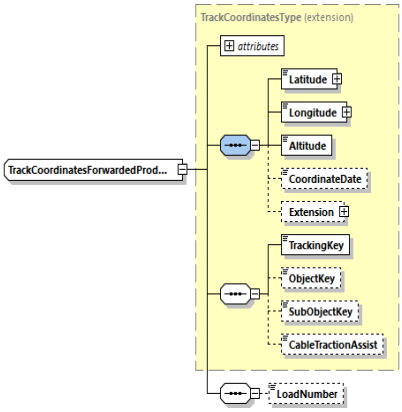
Modifying the basic structure of tracking has been discussed but it was decided at the previous meeting to keep the structure as it is today.

The TrackingType is today located in the common definition. This type is then used in e.g. hpr- and mom-schemas.

However, there will probably be a need to use Tracking in different ways in different messages as illustrated below where some elements are relevant only in the mom and other in a possible new scarification message.



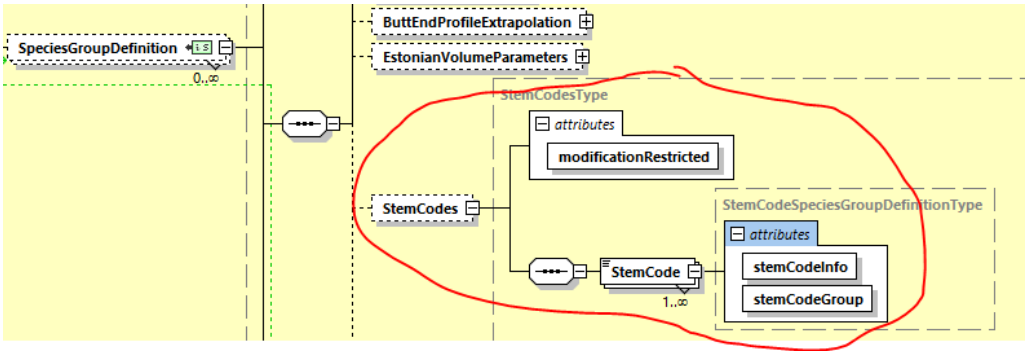
It was therefore decided to modify the Tracking so that a message specific Tracking-type is implemented for each type of message as illustrated below where a hypothetical Tracking-type specific for fpr is included:



STEMCODE

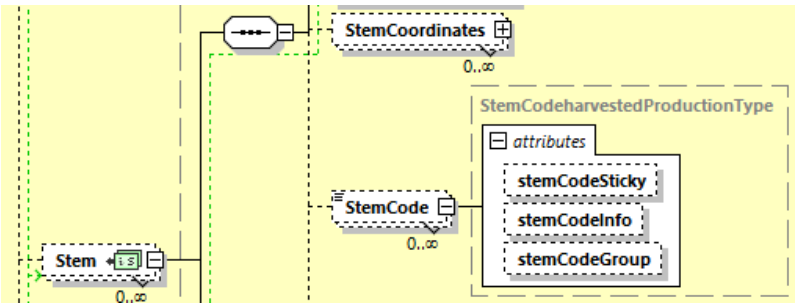
John Arlinger and Johan Möller 2020-09-03. Niclas Eriksson, Komatsu, 2020-10-23.

It was decided at the previous meeting to add the following updated structure to the SpeciesGroupDefinition (spi):

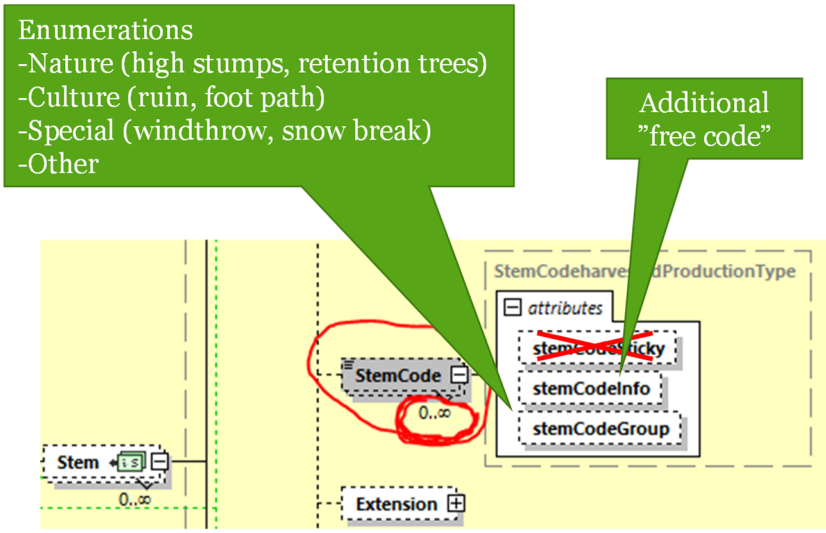


It was decided to add the following standardized enumeration values to attribute stemCodeGroup:
-Nature (high stumps, retention trees etc)
-Culture (ruin, foot path etc)
-Special harvesting (selective cutting, windthrow, snow breakage etc)
-Other

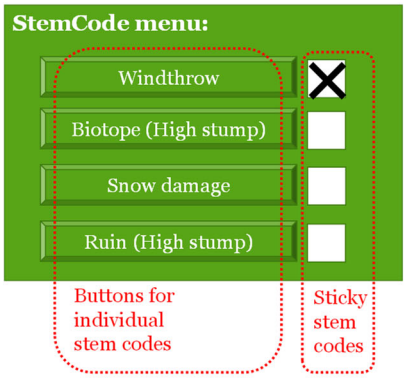
It was also discussed to add attribute "stemCodeSticky" to element StemCode in hpr as a boolean. True is to be used when "sticky function" is used. Sticky function should be implemented so that it is in use until operator de-activates the function. Should in other words not be de-activated automatically if species is changed or if a single ("intermittent") stem code is registered.

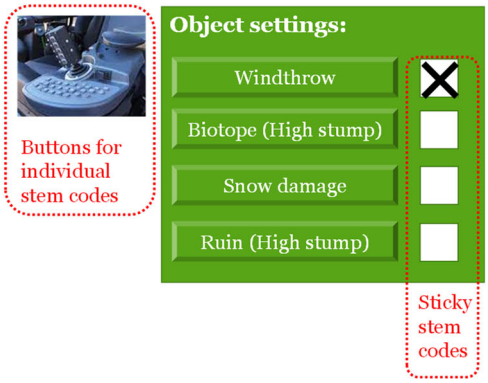


It was decided to adjust StemCode registration per stem (in hpr, hqc and bpr) according to the following illustration where no attribute is included for keeping sticky and non-sticky codes apart. Attribute stemCodeSticky (discussed 2021-02-05) is thus to be deleted as suggested by Jonas Thorsson. The main argument being that a stem code is a stem code independently of whether it is sticky, semi-sticky or non-sticky.



Possible user-interfaces for registering stem codes are illustrated below. The main objective with these examples is to point out that the "input method" can vary significantly from machine system to machine system.



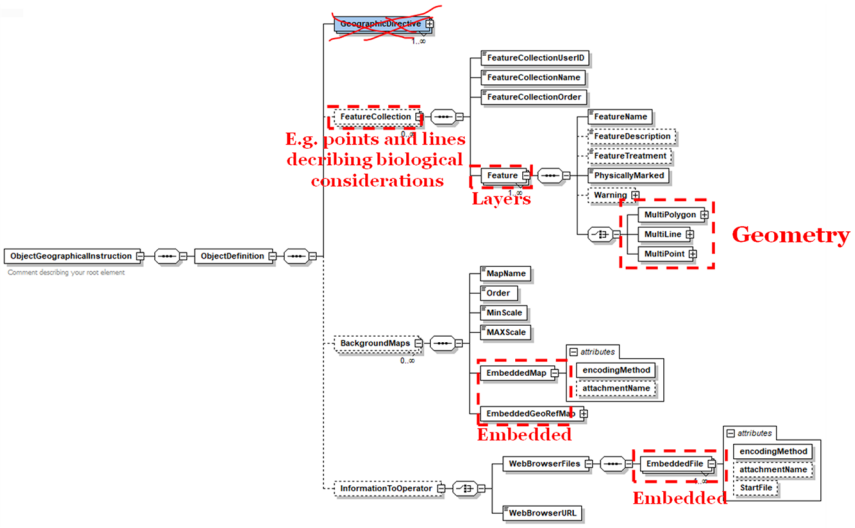


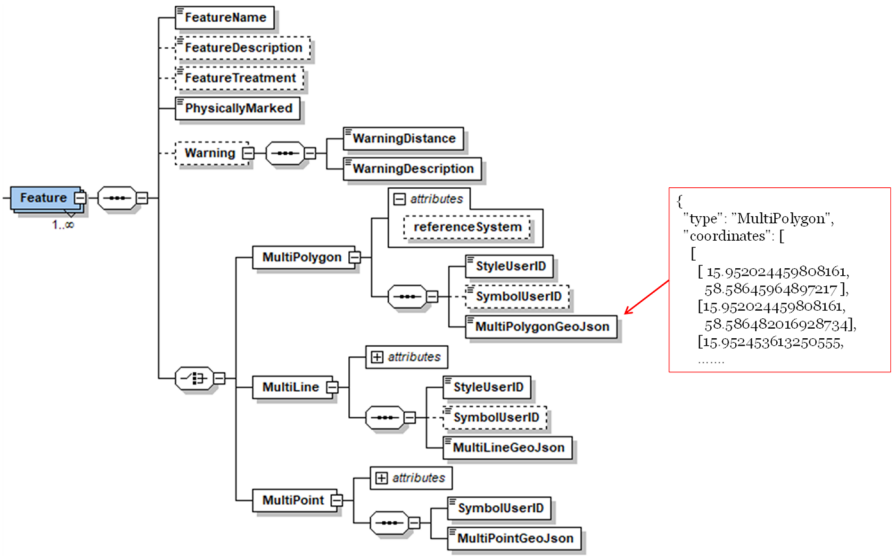
It was decided to recommend that a possible "sticky stem code" is not de-activated unless operator selects another sticky stem code or manually de-activates the present sticky stem code. This means that the sticky code is not affected if a "individual stem code" is selected or if a new species group is selected.

However, it was decided that "changing Object" must de-activate sticky stem code!

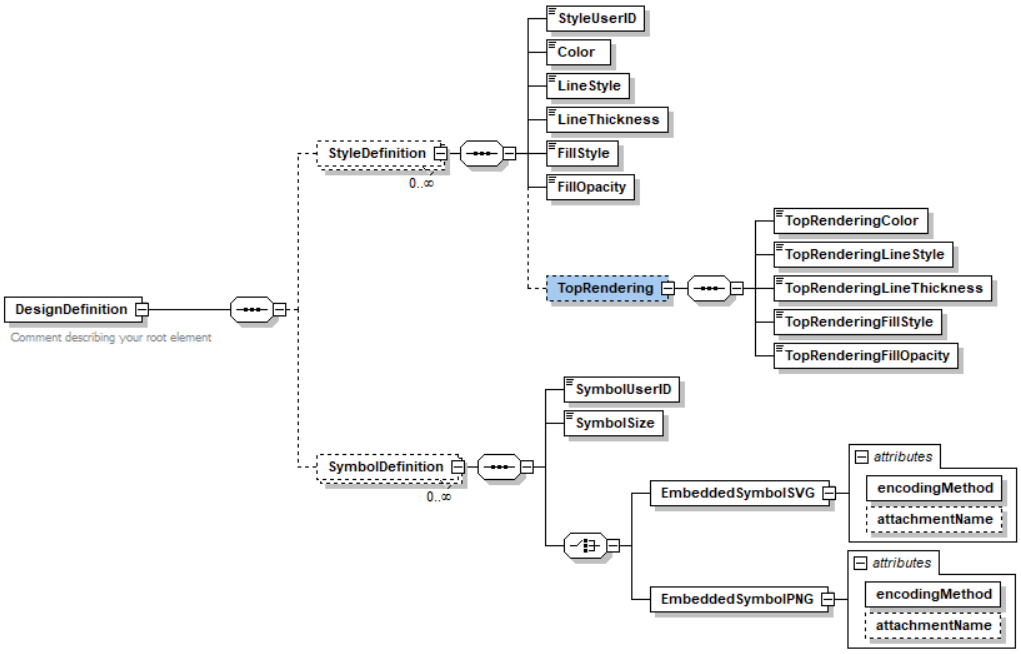
ADDING EXTENSIONS TO NEW OGI-SCHEMAS

It was decided, at the last meeting, to implement the following new structure in the ogi where the geographical features are registered using GeoJSON:



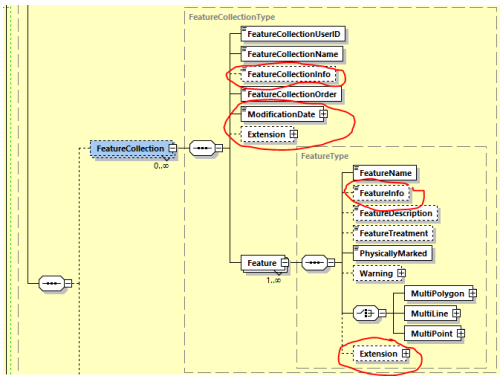


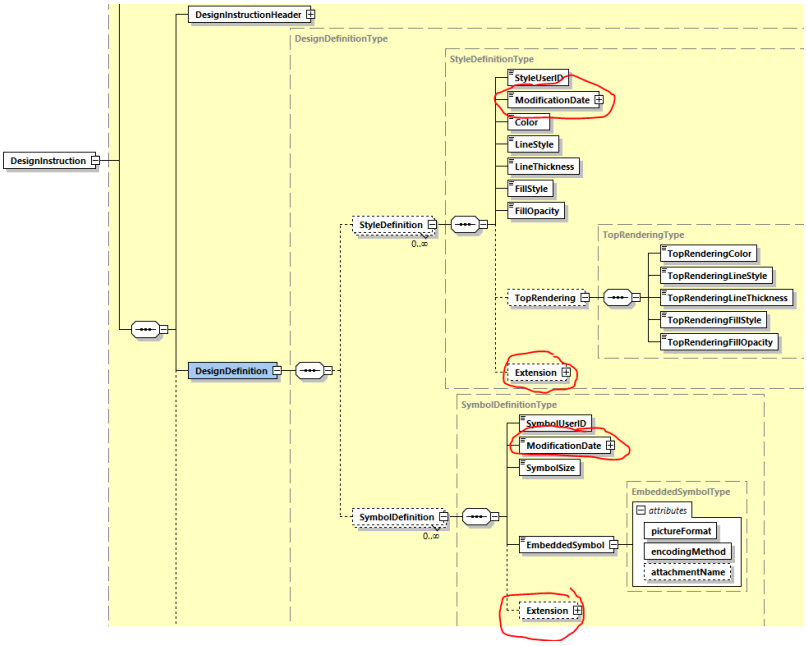
It was also decided (2021-02-05) to add a new schema called DesignTemplate (DIN) according to this structure:

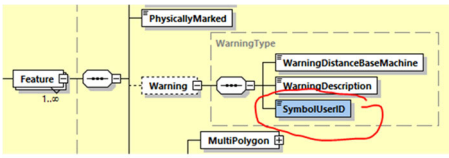


A few updates are needed. It was <u>decided</u> to add:

- Extension elements to Feature, FeatureCollection, StyleDefinition, SymbolDefinition.
- ModificationDate to FeatureCollection, StyleDefinition, SymbolDefinition.
- FeatureCollectionInfo element to FeatureCollection
- FeatureInfo element to Feature
- SymbolUserID element to Warning







Different symbols for:

- Warning
- Info
- Stop

Name	Data type	Unit	Description
Extension			Extension element can include whatever data the users want. The only requirement is that it is well-formed XML i.e. it is tagged
ModificationDate		yyyy-mm-ddThh:mm:ss[+|-]hh:mm	Information used to calculate where logs have been loaded on or unloaded off the load space of a forwarder.
FeatureCollectionInfo	string	free text	Free text identity information about feature collection. Identity element normally to be used by logging organization. No constraints in standard concerning how to use this element.
FeatureInfo	String	free text	Free text identity information about feature. Identity element normally to be used by logging organization. No constraints in standard concerning how to use this element.
SymbolUserID	string	free text	Identity per Symbol as defined in DIN-file. Set by user of data, normally logging organisation. Do not use a single space or null value. Do not begin or end with a space. Do not include any of the following characters: Double space, Linefeed, carriage return,%, ?, lt, gt, :, " (double quote), /, \, |, *.

Observe that Juha-Antti Sorsa has created three JSON schemas defining the JSON strings included in elements MultiPolygonGeoJSON, MultiLineGeoJSON and MultiPointGeoJSON. These schemas are distributed together with the pre-release schemas (MultiPolygonSchema.json, MultiLineStringSchema.json and MultiPointSchema.json). The JSON schemas can be used in order to check if a separate GeoJSON string is correct or not.

SIGNIFICANT RE-STRUCTURING OF MOM-SCHEMA

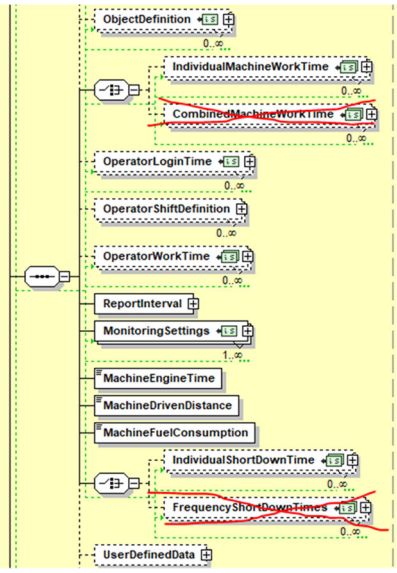
A number of problems caused by the present structure of the mom schema has been noted since the introduction of StanForD2010. The main driving forces are:

- Two main dialects exist due to the fact that work times can be registered using IndividualMachineWorkTimes OR CombinedMachineWorkTimes.
- Complex user interface due to the fact that a very large number of reasons for down times and other work has been standardized in "StanForD2010CodeList_V*p*.xsd"
- Market specific code requirements are difficult (takes a long time) to implement due to the fact that all codes must be added to "StanForD2010CodeList_V*p*.xsd".

Combined times excluded

Excluding "combined" times from the mom schema would make the standard more consistent and simpler to use. Observe that the present pre-release schemas have not been updated according to the decisions described below.

It has been decided (2021-02-07) that CombinedWorkTime and FrequencyShortDownTimes are excluded from the mom schema:



New enumeration "WinchAnchoring"

Proposal from Heikki Komulainen, Ponsse (2020-10-29).

There is a market need to report the downtime caused by winch anchoring and releasing in mom with a specific code:

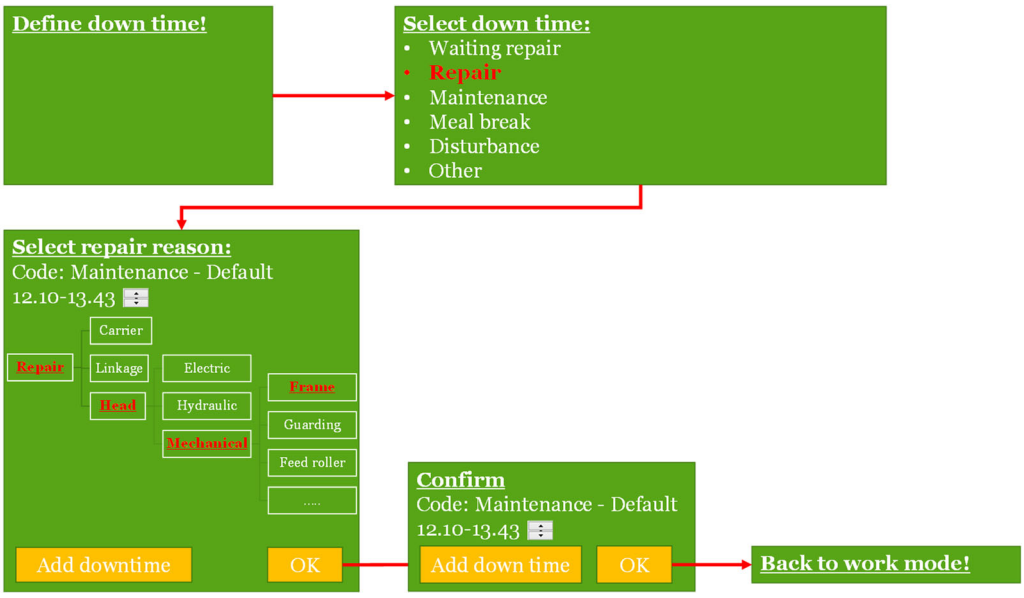
- to be used both for harvesting and forwarding
- harvesting at slopes is more common in many parts of the world and winch work is an essential part of the daily operations

It was suggested that value "Winch anchoring" is added to OtherMachineDownTimeCodeCategory.

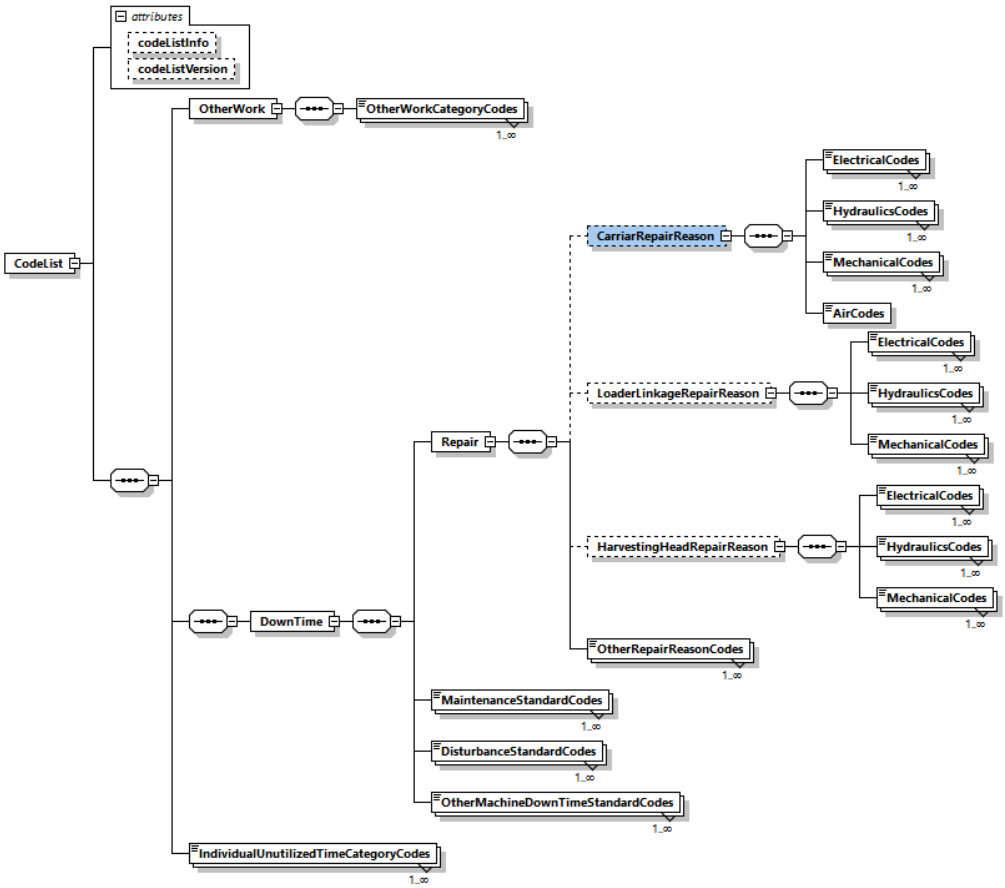
Simplified down time reasons

Another improvement could be to make it possible to simplify registration of down time reasons.

Below is a flow chart illustrating how a down time is normally registered today. The operator must navigate through a large number of steps in order to select e.g. a specific repair reason.



It was decided (2021-02-05) to create a new schema for user defined mom codes as illustrated below. This means that the same structure as today is used.



Reference between Operator and MachineWorkTime

Discussion with Henrik Persson 2020-12-11. The possibility of adding MachineWorkTimeKey for each time and add this to OperatorWorkTime was discussed.

Decisions at the previous meeting (2021-02-05):

- Exclude combined times and frequency short down times.
- Develop a new schema for distributing user defined down time codes. A use case to be developed to illustrate how to use this schema.
- Exclude ShiftKey from the IndividualMachineWorkTime and to discuss how Shift, OperatorWorkTime, Login and MachineWorkTime are related to each other at the next meeting.

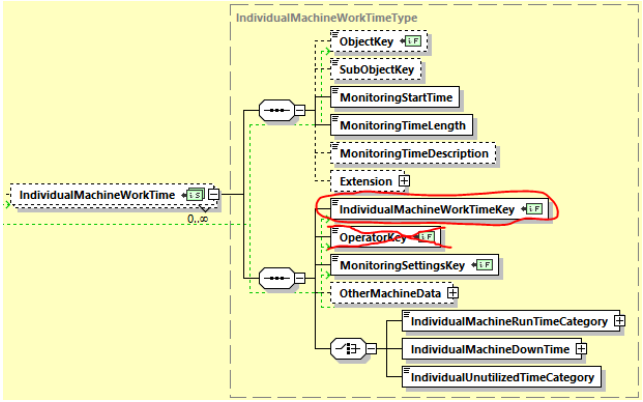
Relationships between MachineWork, Shift and OperatorWork

When creating the mom-file a fundamental idea was that the MachineWorkTimes and ShortDownTimes shall not be dependent on e.g. OperatorWorkTime or ShiftDefinition. The concept of shift is not defined in the standard. It is presently up to the individual manufacturer to implement it.

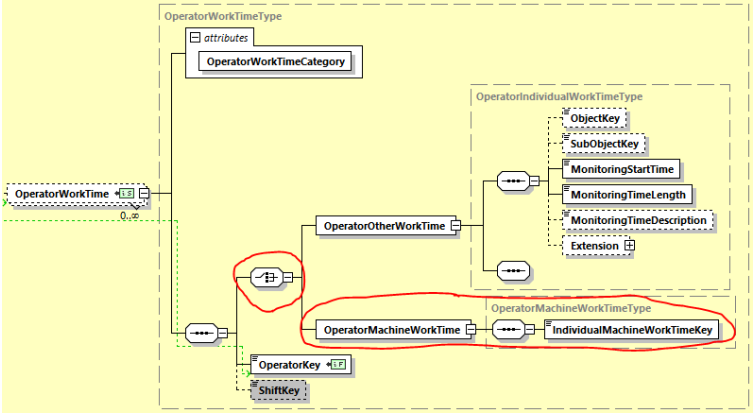
It has been noted in discussions between Henrik Persson and John Arlinger (2021-04-19) that the present use of OperatorKey in MachineWorkTime and OperatorWorkTime causes some problems. E.g. the following cases may be difficult to handle today:

- Two operators repair a machine together
- No operator present at all (waiting for repair, unutilized time, repair and maintenance at workshop)

Below is a possible re-structuring of the MachineWorkTime:



Below is a possible re-structuring of the OperatorWorkTime which solves the problems described above:

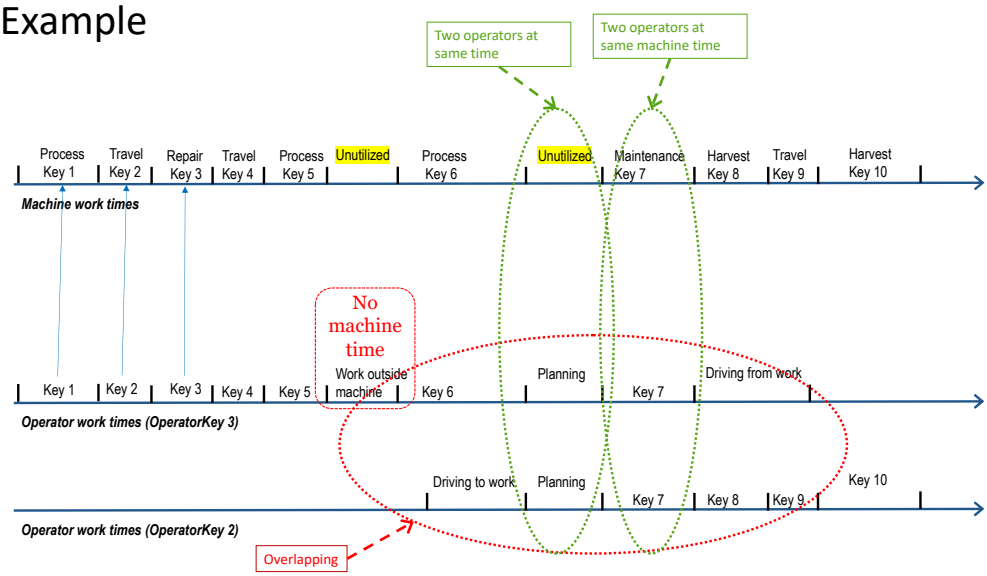


Examples illustrating how to use the updated structure for mom:

OperatorWorkTime (15)

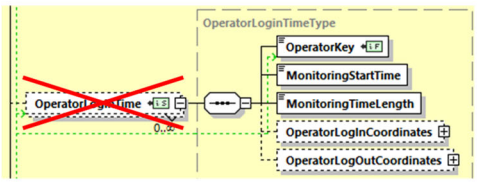
	OperatorWorkTimeCategory	Comment	OperatorMachineWorkTime	OperatorIndividualWorkTime	OperatorKey	ShiftKey
1	MachineWorkTime	Processing	OperatorMachineWorkTime IndividualMachineWorkTimeKey 1		3	186
2	MachineWorkTime	Terrrain travel	OperatorMachineWorkTime IndividualMachineWorkTimeKey 2		3	186
3	MachineWorkTime	Refueling	OperatorMachineWorkTime IndividualMachineWorkTimeKey 3		3	186
4	MachineWorkTime	Terrrain travel	OperatorMachineWorkTime IndividualMachineWorkTimeKey 4		3	186
5	MachineWorkTime	Processing	OperatorMachineWorkTime IndividualMachineWorkTimeKey 5		3	186
6	Other work outside machine			OperatorIndividualWorkTime ObjectKey 5 MonitoringStartTin 2019-11-20T10:31:04+01:00 MonitoringTimeLe 3180	3	186
7	MachineWorkTime	Processing	OperatorMachineWorkTime IndividualMachineWorkTimeKey 6		3	186
8	Travelling to work outside machine			OperatorIndividualWorkTime ObjectKey 5 MonitoringStartTin 2019-11-20T11:04:36+01:00 MonitoringTimeLe 1800	2	187
9	Planning outside machine			OperatorIndividualWorkTime ObjectKey 5 MonitoringStartTin 2019-11-20T11:34:36+01:00 MonitoringTimeLe 518	3	186
10	Planning outside machine			OperatorIndividualWorkTime ObjectKey 5 MonitoringStartTin 2019-11-20T11:34:36+01:00 MonitoringTimeLe 518	2	187
11	MachineWorkTime	Maintenance	OperatorMachineWorkTime IndividualMachineWorkTimeKey 7		3	186
12	MachineWorkTime	Maintenance	OperatorMachineWorkTime IndividualMachineWorkTimeKey 7		2	187
13	MachineWorkTime	Processing	OperatorMachineWorkTime IndividualMachineWorkTimeKey 8		2	187
14	MachineWorkTime	Terrrain travel	OperatorMachineWorkTime IndividualMachineWorkTimeKey 9		2	187
15	MachineWorkTime	Processing	OperatorMachineWorkTime IndividualMachineWorkTimeKey 10		2	187

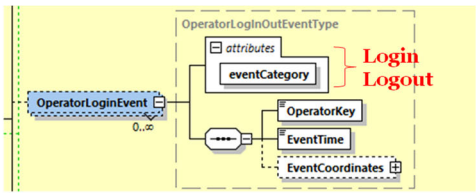
Example



Several participants were critical of the proposal due to the fact that they do not view the present structure to be any obstacle to handling multiple operators connected to one MachineWorkTime. It was decided to let the secretary study this issue before the next meeting. Observe that it was verified, after the meeting, by the secretary that the present structure makes it possible to have several OperatorWorkTimes for the same MachineWorkTime.

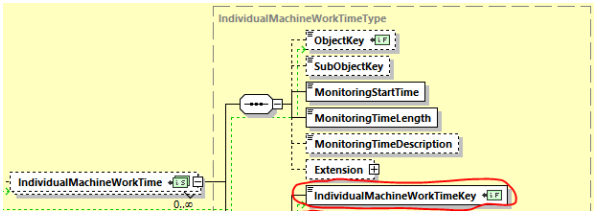
Since there were no objections at the meeting it was decided with the minutes that the OperatorLoginTime is replaced by the OperatorLogInEvent as illustrated below:





Name	Data type	Unit	Description
OperatorLoginEvent			Structure for register when operator is logged into or out of machine software system.
eventCategory	String	list	Type of log in event. Allowed values: "Login", "Logout"
OperatorKey	Integer	sequential no	Machine unique operator identity, set by machine
EventTime		yyyy-mm-ddThh:mm:ss[+|-]hh:mm	Time of log-in or log-out, Time stamp must have the following times registered: local time ±offset from UTC.
EventCoordinates			Coordinates of the machine at the time of log-in or log-out.

It was also decided with the minutes that we add an IndividualMachineWorkTimeKey to IndividualMachineWorkTime as illustrated below:

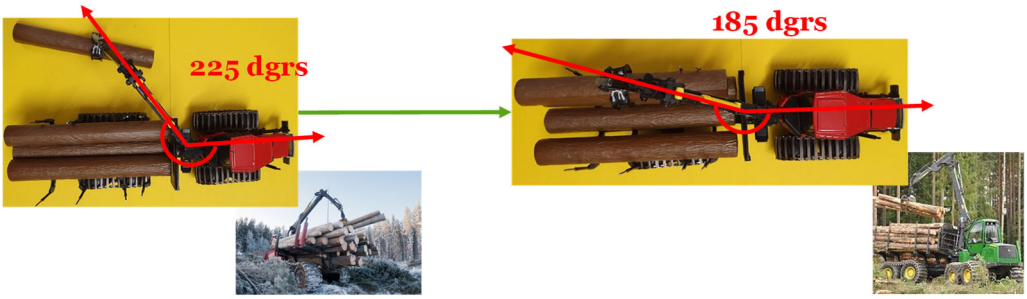


Name	Data type	Unit	Description
IndividualMachineWorkTimeKey	integer	sequential number	Machine specific identity per individual machine work time. Must be totally unique for a certain MachineKey. Reset only when MachineKey is changed.

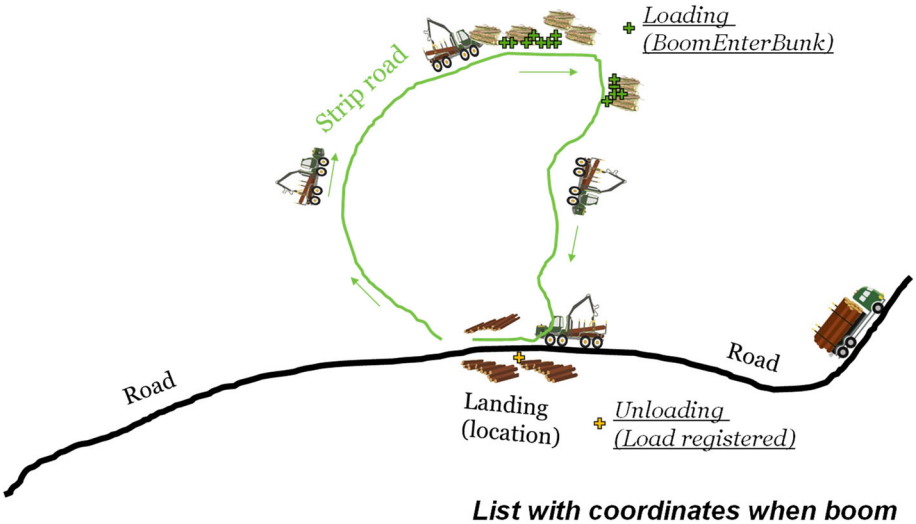
RE-STRUCTURING OF FPR-SCHEMA

Adding more detailed information related to where logs are loaded in the forest would make it possible to improve traceability (connect harvester data with forwarder data). The aim is to find a model that is not relying on time stamps or Tracking data.

An idea could be to look at the possibility to register a "LoadChange" each time logs have been loaded or unloaded as determined by the control system. A simple method could be to determine each time the boom has been moved into or out of the bunk (e.g. utilizing signals indicating when boom angle changes from e.g. 225 degrees to 185 degrees). Observe that the objective is not to get 100% certain loading positions but rather a rough estimate of where logs probably have been loaded or unloaded.

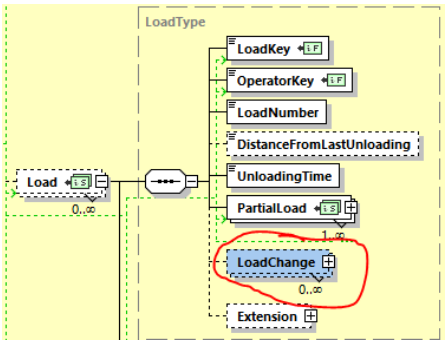


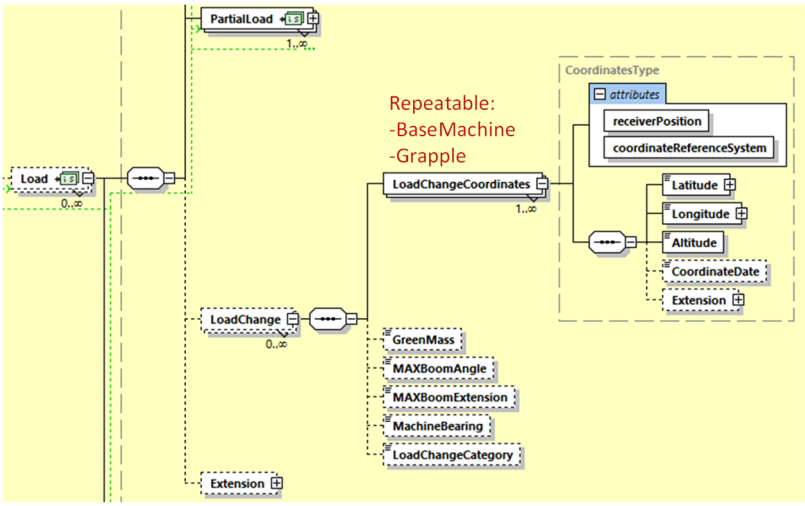
These boom activities should be registered for each Load in order to make it possible to connect each "LoadChange" to a specific load.



List with coordinates when boom "entered" load bunk.
Boom angle from 45 to 5 degrees?

It was decided to add a structure for registering LoadChange for each Load as illustrated below. Observe that this construction means that we in the future can add a new enumeration "Grapple" to attribute recieverPosition. Observe that there will not be any strict definition of the LoadChange event. The exact definition will be up to the individual manufacturer.





Name	Data type	Unit	Description
LoadChange			Information used to calculate where logs have been loaded on or unloaded off the load space of a forwarder.
LoadChange-Coordinates	CoordinatesType		Load change coordinates, describes the location of where the load has changed to loading or unloading.
GreenMass	Integer	kg	Green/raw mass (kg)
MaxBoomAngle	NonNegativeInteger	Degrees	Maximum angle of boom (0-360 degrees) when felleing or loading/unloading. BoomAngle is equal to the difference between MachineBearing and the angle of the boom. BoomAngle is registered in degrees where 0º is equal to MachineBearing, 0° is thus straight backwards, 90° is straight to the right and 270° is straight to the left. In case of a forwarder a boom angle of 180 degrees means that the boom is in the centre of the load space.
MaxBoomExtension	PositiveInteger	cm	Extension of boom when angle is registered. This is the distance from the forwarder to the grapple. This value can be a "default" value indicating the "normal" extension.
MachineBearing	NonNegativeInteger	Degrees	The bearing (0-360 degrees) of the machine when boom angle is registered. MeachineBearing is perpendicular to the front wheel axis (90º). MachineBearing is registered in degrees where 0º is north, 90° is east, 180° is south and 270° is west.
LoadChangeCategory	String	List	Allowed values: "Loading", "Unloading"

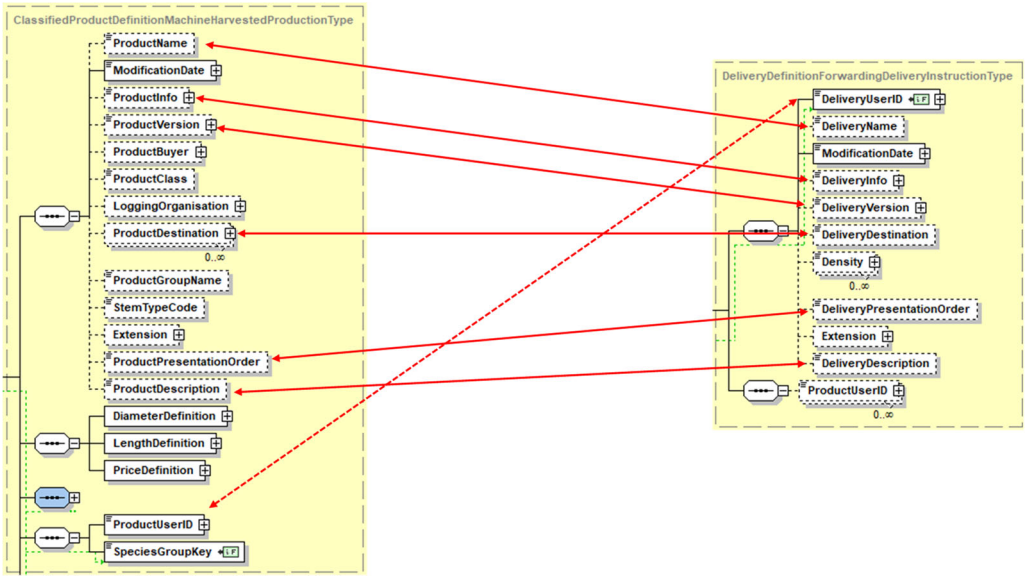
STARTING FORWARDING OBJECT USING HPR

Discussion Erik Kindlund and John Arlinger, 2020-12-18

It will probably be relevant on many markets to make it possible to start a forwarding object using an hpr-file. This is probably especially relevant in cases where a gis-application is used for reporting forwarder production and no forwarding instructions (foi and fdi) are available at all.

One solution could be to add a DeliveryDefinition to each ProductDefinition in the pin and hpr. This means merging part of the fdi into the pin or only adding DeliveryUserID to the ProductDefinition in the pin.

Another solution could be to create some framework for how to "semi-automatically" create a DeliveryDefinition based on an existing ProductDefinition as illustrated by the "mapping arrows" below:



If Deliveries are created based on the hpr, as illustrated above, no Density information is available. It would thus be necessary for the operator to set this manually in some way.

It was also suggested that we discuss how to handle cases where there is a mismatch between ProductUserIDs in hpr vs fdi.

It was decided to consider this as an "implementation issue" managed outside the standard.

SUBOBJECT

Discussion StanForD-meeting 2017-11-22

SubObjects are mandatory in several machine systems. This means that a SubObject is always created per default when creating a new object.

It was suggested that to make SubObjectKey (under Stem) and SubObject (under Object) mandatory in files sent from forest machines in 4.0.

SubObjects are used by some Swedish companies, e.g. SubObjectUserID is registered by Biometria,

An idea raised at the meeting was to include a flag indicating if a SubObject has been automatically created by default.

It was decided to reject this issue.

IMPLEMENTATION RULES REGARDING PRIORITIZED FUNCTIONS

Not discussed at last meeting (2020-12-03).

Henrik Persson, LogMax, 2019-06-28

New functional requirements could be added, e.g.:

In order to publish ver 4 all applications must support the following functionalities even though these functions might not be used in all situations:

- *Tracking*
- *StemCode*
- *TopLogFreeBuck*
- *modificationRestricted*
- *UserDefinedData*
- *BoomPositioning*
- *StumpTreatment*

Adding these types of requirement could be difficult since the communication between controller and base machine might have limitations (e.g. boom positioning) or the need for some functions might not exist on certain markets at all (e.g. StumpTreatment or UserDefinedData).

One suggestion (2020-08-17) is to add attribute under Machine that indicates what functions are supported. Another solution could be to state that this is an issue that depends on the market requirements. Some major markets could probably "join forces" to give very velar signals about what is expected from 4.0 versions.

This is not a proposal but a possible starting point for a discussion!

It was decided to reject this issue.

SPELLING ERRORS

Bark functions

Anders Nylund 2014-04-08.

Exclude country specific names for different bark functions.

Older bark functions excluded.

Postpone, to be dealt with jointly with possible addition of a new bark function in September 2021.

§5 Items for discussion

DIAMETERSECTION

StanForD-meeting 2018-11-20 and Teemu Paldanius, Ponsse, 2018-11-01.

It was decided at a previous meeting (2020-12-03) to updated the structures for registering DiameterSections, e.g. the DiameterSectionDefinition was moved into the ObjectDefinition in the oin schema.

There was also a discussion (2020-12-03) regarding the needs for this type of calculated data since it could very well be calculated using the diameter vector. It was pointed out by the secretary that this type of calculated data would not be added to the standard today but that it is deemed difficult to remove it for historical reasons.

It would be technically quite simple to update the diameter vector to also include a volume for each "length module" as illustrated below using present or new structure:

StemDiameters

diameterCategory	Over bark
DiameterMeasured	120
DiameterMeasured	0

DiameterValue (122)

	diameterPosition	diameterMeasuren	volume	Text
1	0	Average	769.8	99
2	10	Average	636.2	90
3	20	Average	608.2	88
4	30	Average	528.1	82

StemDiameters

diameterCategory	Over bark
DiameterMeasuredStartHeight	120
DiameterMeasuredEndHeight	0

DiameterVector

diameterMeasurementCategory	Average

DIA (122)

	POS	VOL	Text
1	0	769.8	99
2	10	636.2	90
3	20	608.2	88
4	30	528.1	82
5	40	528.1	82
6	50	528.1	82
7	60	528.1	82

Observe that the last dm-module in the DiameterVector would include volume up to the end of the stem, e.g. the last volume would be based on length 5 cm if last registered diameter is at 2370 cm but the last available measurement is at 2375.

This issue was postponed to the next meeting.

NEW ENUMERATIONS TO LIMITATIONCATEGORYTYPE

Proposal raised by Metsä Group and Stora Enso and prepared by Trimble Forestry (Jyrki Vainio). Discussed at Finnish StanForD meetings 2020-10-29 and 2021-03-25.

Objectives and background

Pin files control the bucking of the logs according to the demand

- length distribution targets by diameter classes
- certain (low value) log dimensions can be set to allowed even if there is no demand for them

In practice there are always logs in the production that have not been cut optimally due to wood quality or other reasons

- quite often the number of such manually cut logs is more than expected
- operators´ way of working shows in the shares of manually cut logs

Objective is that there would not be any need for object-specific adjusting of pin's

- bucking limitations should be the same for all type of objects

- it should be possible to keep the limitations the same over time

Aim is to minimize the share of manual bucking and to use automatic bucking also in controlling the allowed share of logs that have to be cut outside the targeted demand

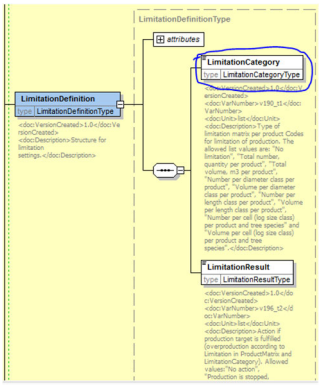
- it is better to include certain no-targeted dimensions in automatic bucking than to forbid them totally

Development of automatic bucking

- to make bucking working without distribution matrices if those are not needed
    - to apply only price matrices and new limitation category types ?
- to minimize the use of other bucking restrictions
    - e.g. limitations based on number of logs
- to better control the production of a harvester group and to adapt pin's to changing situations
    - optimization of pin's based on simulations
- to cut the valuable part of stems (sawlogs) more precisely

Proposal for new type of limitation matrix was discussed. This is done by adding new enumeration values to LimitationCategoryType:

- Relative volume in cell (log class) per total diameter class volume
- Relative number in cell (log class) per total diameter class numbers
- Relative volume in cell (log class) per total product volume
- Relative number in cell (log class) per total product numbers



Action in the bucking system

Intention with the new types is that the quantity of logs to be limited (number or volume of logs). The limitation is to increase as the total quantity of product (or diameter class) increases.

As the total quantity increases, logs that can be cut up to the set limitation percentage according to what has been set in LimitationResult.

Example

- Dimensions of log class (cell)
  - length = 310 cm
  - diameter = 150 mm
- LimitationCategoryType = "Percentage of number of logs in cell per diameter class"
- Limitation = 5%

Number of cut logs in diameter class 150 mm	Maximum number of logs allowed to cut in cell (log class 310 cm & 150 mm) according to LimitationCategoryType and Limitation value
20	1
40	2
60	3

Issues to be considered

How does this kind of limitation work in the beginning of the Object? Especially if the quality of the stems is poor.

- Proposal of Trimble: LimitationResult can always be set to "Production is stopped, forbidden to buck logs, only manually bucked logs allowed"
  - manual cutting of logs is allowed to do, if necessary
  - cutting of more valuable saw logs is still possible instead of cutting pulpwood logs

Action in the bucking system when a new Object is started or pin is updated?

- The limitation can be reset when a new object is started with the same pin.

Machine operators need to understand well how the limitation works in different cases.

A quite long discussion where it became evident that the participants did not have a common understanding of the proposal as to its consequences and its objectives.

It was decided that a separate meeting is to be held on the 28th of May to discuss this issue further. Skogforsk, Metsäteho and Trimble to be invited by Metsäteho.

It was decided to discuss this issue at the next meeting. It was suggested that a practical analysis is done (by Trimble) on the effects based on "real" hpr-data. A real case example is probably needed in order to get a common understanding.

FUEL AND CO_2 REPORTING IN HPR AND FPR.

Tapio Räsänen, Metsäteho, 2021-04-16.

There is a growing need in forest industry to report CO2 emissions of wood supply operations as part of the environmental impacts of the end products

- improvement of environment efficiency

- reporting of emissions per m3 on harvesting object (site level) is required, no need to report on assortment level
- also other operations than harvesting, forwarding and transports must be considered in final analysis
- giving fuel consumption information from contractors to their customers is a sensitive question and does not happen (at least in Finland)

Any discussion around the subject in Swedish industry?

In practice the forest machines may be able to measure and report only the fuel consumption, not emissions (at least in the beginning)

- other emission components should be added as calculated based on emission class of the engine or model of the machine or some other information
- fuel type ?

Aim is that fuel consumption figures would be reported in hpr and fpr files per object and would be linked to other logistics information in forest company systems

Proposal is that the standardization of emission and fuel consumption data is prepared in a StanForD working group

- machine manufacturers, Skogforsk and Metsäteho
- first to look at the technical conditions and reporting possibilities of the machines
- to define common emission measurement and calculation principles and methods
- need for a wider project?

This issue was postponed due to running out of time.

DISTRIBUTION BUCKING AND MULTI TREE PROCESSING

Anders Nylund, Komatsu, 2020-10-02

How to handle MTP-logs when working with distribution bucking? To be used in the algorithm or not?

If we have time the idea is to have a discussion regarding this issue.

Comment from Skogforsk: No need to include MTP-logs in length distribution bucking since there is limited relevance.

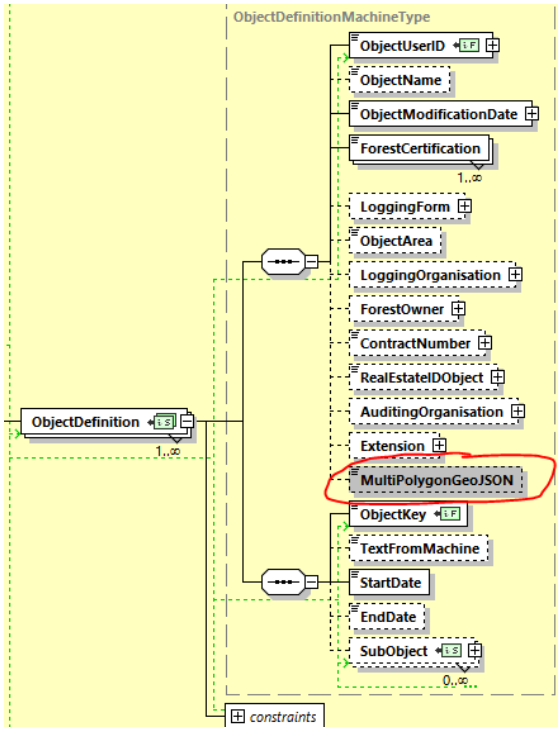
Decided to let secretary check with all manufacturers how this issue is handled today. This issue will be discussed at the next meeting.

A questionnaire was distributed to all manufacturers after the meeting. Below are the answers received by 2021-05-04 (so far no answers from JohnDeere, Dasa and LogSet):

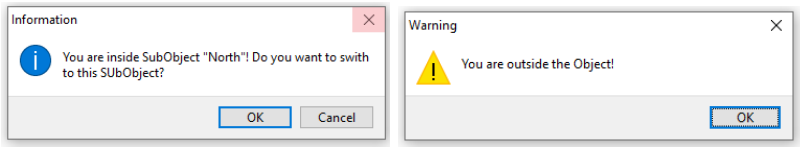
Control system	Is length distribution bucking used on multi-tree-processed (MTP) stems at all?	Are multi-tree-processed (MTP) logs considered when running length distribution? Are they included in the log matrix used for calculating optimal length distribution?
Ponsse Opti	NO - Distribution is not taken in account when calculating optimization in MTH, (pre-defined target length used for MTP). Might affect to singe tree processing calculation	YES - logs (from bunch) are registered in distribution follow up matrix. Multi tree processed logs affect STP length optimization.
Technion xLogger	YES – Distribution affects bucking result when multi-tree-processing scaling is active.	NO – MTP logs are not considered and not included in matrix as their number increases
Komatsu MaxiXT	YES – MTP-stems are fully bucked with products on a reference profile so product distribution and limits are in use. It's possible to use different product due to quality if single/multi should differ in distribution.	NO - MultiTree production is not included in distribution and limit data. Distribution and limit are based on single stem data. There is a programmer setting for testing it.
LogMax LogMate	YES – No consideration is paid to whether a stem is MTP or STP when using the distribution logic. Majority of operators use pre-defined target lengths when in MTP.	YES – Logs from MTP handled in the same way as STP.

GEOGRAPHICAL DE-LIMITATIONS IN OIN (GEO-FENCING)?

Connecting polygons to Object and SubObject using ObjectUserID and SubObjectUserID in order to open up possibility to automatically switch between different sub-objects in e.g. harvester or feller-buncher. A simple way could be to add a MultiPolygon element under Object and SubObject.



This would make it possible to display messages as illustrated below:



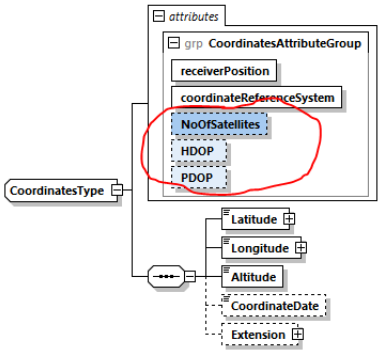
This issue was postponed due to running out of time.

GNSS PRECISION

Patrik Anderchen, Södra 2021-03-18.

Add new elements for some NMEA parameters to CoordinateType:

- No of satellites
- HDOP
- PDOP



This issue was postponed due to running out of time.

§6 StanForD2010 projects / implementations

POSSIBLE FORWARDER TEST IN SWEDEN (SVEASKOG AND SKOGFORSK)

Johan Möller presented an idea to arrange a forwarder test in Sweden during late spring 2021. The test will be carried out together with Sveaskog.

The idea is to run the test including the following parts:

1. New object using manual registration of unloaded volume
    - Start with complete Envelope include pre-defined locations.
    - Open and activate updated Delivery (fdi).
2. New object using manual registration of unloaded volume
    - New Delivery (fdi) added
    - Start with new foi without any correctly defined locations
    - Open and activate updated foi (additional Delivery).
    - Manually create locations with correct coordinates.
    - Take an updated foi (new delivery added) into use.

3. New object using registration of unloaded mass with scale and testing scale control (fqc) if scale measurements are available
    - Start with new foi using SenderXC
4. New object using automatic registration of unloaded volume based on hpr-data (if GIS-functionality is available)
    - Start with new foi
    - Control if volume is included in mom
5. Other tests
    - Control conversion between mass and volume.
    - Check if tracking is included
    - Evaluate GUI for delivery vs product
    - GIS-application (hpr-data presented independently of manufacturer brand)
    - Correct identities in fpr and mom.
    - How is the delivery library working?
    - Registration of negative volumes possible?
    - Simplicity when starting an object with a new foi.
    - Other functionalities that the manufacturer wants to be tested/shown.

§7 Other issues

No other issues.

§8 Next meeting

StanForD meeting 2021-06-15, Teams (10:00-16:00 CET)

StanForD meeting 2021-09-15, Teams (10:00-16:00 CET)

Possible REST API meeting 2021-08-25, Teams, (13:00-16:00 CET). Experiences from work with version 1.0 and needs for a data-API.

By default, all financially contributing members will receive an Outlook invitation to all meetings in advance.

§9 End of meeting

The chairman thanked everyone for attending the meeting.