

Minutes StanForD2010

2019-11-13

Place:	Skogforsk, Uppsala, 2019-11-13
Participants:	Tapio Räsänen, Metsäteho Timo Melkas, Metsäteho Lars Henriksson, SDC Niclas Eriksson, Komatsu Jonas Gustafsson, Sveaskog Antti Korkiakoski, JohnDeere Bengt Sörvik, Otmeka Fedor Stazenko, Ponsse Heikki Komulainen, Ponsse Henrik Persson, LogMax Andreas Barth, CGI John Arlinger, Secretary Johan J. Möller, Chairman Skype participation: Jonas Thorsson, Dasa Ian Wilson, PHDForest Jeremy Wilson, PHDForest Jean Plamondon, FP Innovation (technical problems) Roger Kristoffersen, Skog-Data Kent Aune, Skog-Data Juha Yli-Hemminki, Exertus Per Knutsson, CGI

Decision summary:

- Next version to be implemented is 3.6.
- New element SawCutWidth added to ControlValues in hqc schema.

- Definition of element Density updated in order to specify that the unit is supposed to be kg/m³.
- LocationDefinition to be optional in the foi-file.
- Add new enumeration value "Not measured in caliper" to RandomControlStemMeasurementMode with description: *Code for control measurement mode per stem. Set in caliper. Allowed enumeration codes for caliper measurement modes: "Both diameters and lengths registered", ~~and~~ "Only lengths registered" and "No lengths or diameters registered in caliper".*
Value can be modified in receiving system.
- Add new optional attribute auditorCategory to ControlMeasurementDefinition with enumerations "Third party", "LoggingOrganization" and "LoggingContractor".
- New hpd-schema (delta hpr) added. It is identical with the hpr-schema but excluding the constraints requiring optional definitions (Product / SpeciesGroup / DiameterSectionDefinitions).
- New bqsc schema (feller buncher quality control) added. Similar to hqc but including control measuring data for DBH and ReferenceDiameter.
- The following text to be added to the description of all UserIDs:
*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, %, ?, /, <, >, :, " (double quote), /, \, |, *.*
- Decided to let Skogforsk consider new bark function. Decision at meeting in February.
- Add to description of ProductCondition (in ProductDefinition):
By default all logs with a starting point within 100 cm from stump cut are "butt logs". Settable in machine. Registered ButtLogMAXStartHeight.
Add optional element for "ButtLogMAXStartHeight" to SpeciesGroupDefinition with following definition:
Defines the maximum start height where a log is to be considered. E.g. if this value is 100 cm all logs having their butt cut below 100 cm must be considered a butt log. This element has an effect if BuckingCondition has value "Buck butt-log only" or "Do not buck butt log"
- Skogforsk to study possibility of updating ogi/ogr (including scarifier data).
- Skogforsk to create beta proposal for yarders and skidders during 2020.

Action list:

○

- The following guidelines should be followed 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 in order to avoid incorrect coordinates.
- TextToMachine an urgent variable to be shown when creating new object in harvester and forwarder.
- The description of OtherMachineDownTimeStandardCode was updated: Allowed values: "Waiting for repair", Trailer transportation", "Unproductive terrain work", "Other", “Default”. “Default” used only in cases where operators have not registered any reason at all. “Default” not to be available in GUI and only generated by control system. “Default” to be used in system where down time reasons are disabled or there is a “time-out”.
- It is strongly recommended to use the gps-latitude when importing spi or to force the operator to manually set this value in the harvester.
- 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.

It was decided to implement a new 3.6 version.

§ 2 Presentation of new member and participants

Presentation of meeting participants as well as the new member Skog-data AS, Norway.

§ 3 Information about decisions at previous meetings

The decisions made at the previous meetings (2019-04-03--04) were presented as well as the action list compiled after the meeting.

- Next version to be implemented is 3.6
- New element SawCutWidth added to ControlValues in hqc schema.
- Definition of element Density updated in order to specify that the unit is supposed to be kg/m3.

Postponed to this meeting:

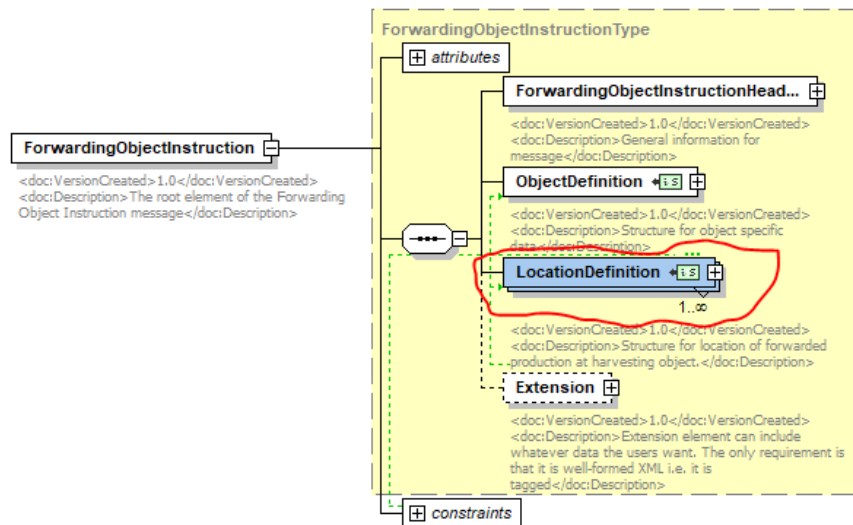
- New hpr-delta schema to be presented
 - including UserIDs (Product, SpeciesGroup, Object etc.).
- Analyze possibilities to include board feet
- Continue work on StanForD API

§ 4 Proposals

LOCATION IN FOI

John Arlinger och Erik Kindlund, 2019-04-11

Today the Location element is mandatory in the foi-file. The Location normally represents a “landing at roadside” where the forwarder unloads logs for truck transportation to a mill.



This is problematic since it is quite common, at least on the Swedish market, that the landing is not defined prior to the start of logging operations. This means that the operators of the machines are responsible for creating one or several different landings.

It was decided to make the LocationDefinition optional in the foi-file.

NEW ENUMERATION “NOTMEASURED” IN RANDOMCONTROLSTEMREJECTEDREASON

Heikki Komulainen, Ponsse (2019-08-20)

A problem might occur in cases when a stem is sent to a caliper but not measured. If this stem is sent back to the control system we may end up in a situation where the control system tries to send the file to the caliper again. A possible solution could be to have a new enumeration “Not measured” set by the receiving control system. Today we normally check this issue by looking at whether any measurements exists or not.

The main reason for having this enumeration is to make certain that these stems are not resent to the harvester as well as making any receiver of data aware of the fact that the stem was first accepted but not actually measured.

Another reason for this is simplicity, the database and the HQC can contain only two kind of control stems: Measured or rejected. Measured stem always contains machine and operator and/or auditor measurement results so there is no possibility of any confusion.

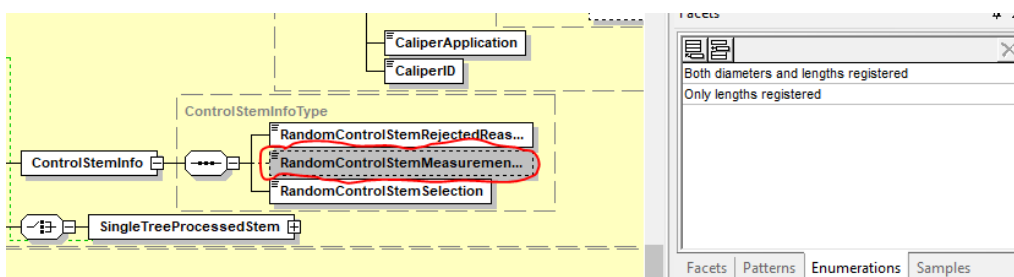
It was therefore suggested that we add the enumeration value “Not measured” to element RandomControlStemRejectedReason.

Name	Data type	Unit	Description
<u>RandomControlStemRejectedReason</u>	String	List	Reason for rejection of randomly selected stems. Enumeration list, allowed values are: "Not rejected", "Stem defect", "Out of reach",

			"Part of stem mixed up with other stems", "Poor weather", "Bucking system error", "Caliper broken", "Other reasons not defined" <u>and "Not measured"</u> <u>Observe that "Not measured" is set in the</u> <u>receiving control system.</u>
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It was discussed whether it is suitable to include this information in the RandomControlStemRejectedReason as well as whether or not to make it possible to register this in the caliper.

It was decided with the minutes that we add a new enumeration value "Not measured in caliper" to RandomControlStemMeasurementMode:



Name	Data type	Unit	Description
RandomControlStemMeasurementMode	String	List	Code for control measurement mode per stem. Set in caliper. Allowed enumeration codes for caliper measurement modes: "Both diameters and lengths registered", <u>and</u> "Only lengths registered" <u>and</u> <u>"No lengths or diameters registered in caliper"</u> . <u>Value can be modified in receiving system.</u>

NEW ATTRIBUTE AUDITORCATEGORY IN HQC

Issue raised by Antti Uurtamo, Masser Oy (2019-11-04)

It is sometimes needed to specify the type of auditor measurer in M3 measurements in cases where type of log measurement is specified with logMeasurementCategory="Auditor"

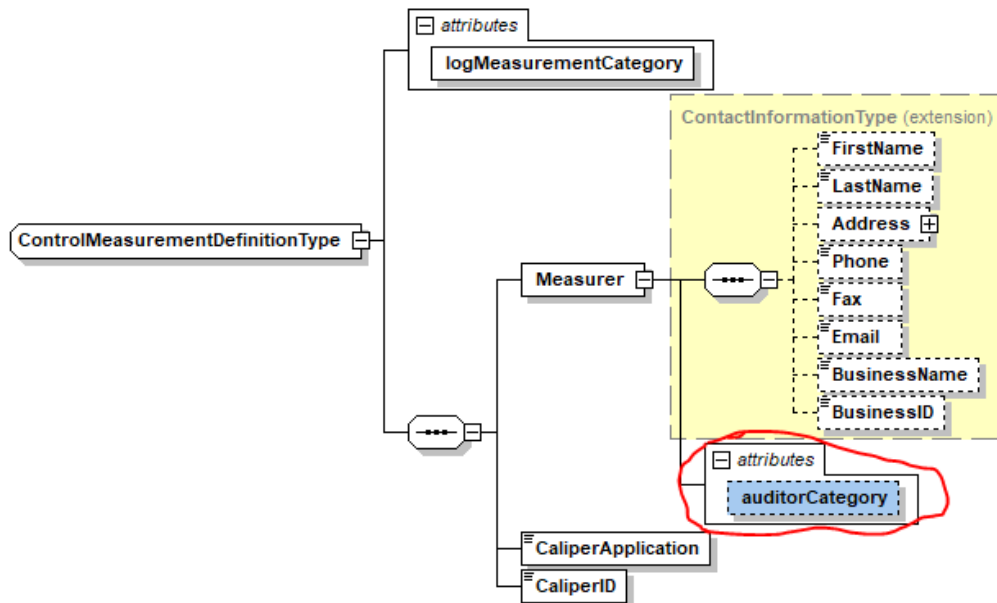
There could be a number of different types of auditors:

- Third party: auditor from third party organisation, e.g. Swedish wood measuring association.
- LoggingOrganisation: supervisor of forest company
- LoggingContractor: contractor or the supervisor/planner of contracting company
- Other: other auditor

It is not a good idea to use logMeasurementCategory with new enumerations for this purpose.

The meeting discussed the most suitable location of the new attribute auditorCategory.

It was decided to add a new optional attribute auditorCategory to ControlMeasurementDefinition according to following figure and table:



Name	Data type	Unit	Description
<u>auditorCategory</u>	String	List	Type of auditor: "Third party", "LoggingOrganization", "LoggingContractor" or "Other "

TOTAL ENGINE TIME PER SHIFT

Heikki Komulainen, Ponsse (2019-08-20)

A Ponsse client needs machine engine hours in the beginning and the end of the work shift to the MOM message. At this moment in DRF we use variable 329 type 26 and 27 (not in standard) to save these values.

The proposal was to add these new optional elements to end of the OperatorShiftDefinitionType. Both of these elements uses the same definitions as MachineEngineTime – element in mom message.

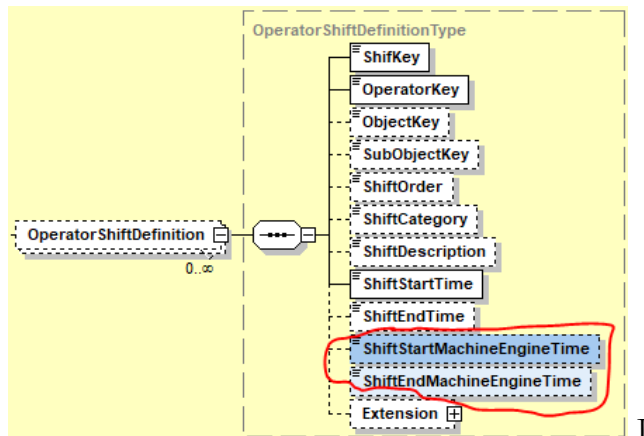
The proposed names of new elements:

- MachineEngineStartTime
- MachineEngineEndTime

The element definitions:

- Type: nonNegativeInteger
- Unit: minutes
- Description: Total engine time, covering total life time of the engine up until the time of the operator shift start/end

It was suggested that we add two new engine times elements is illustrated below



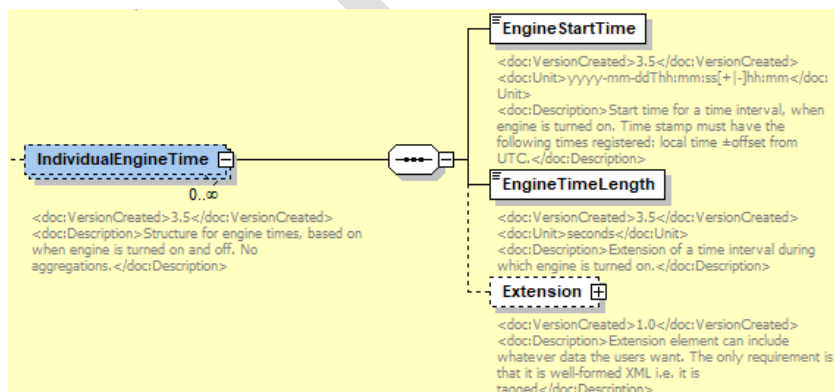
Name	Data type	Unit	Description
ShiftStartMachineEngineTime	nonNegativeInteger	minutes	Total engine time, covering total life time of the engine up until the time of the operator shift start
ShiftEndMachineEngineTime	nonNegativeInteger	minutes	Total engine time, covering total life time of the engine up until the time of the operator shift end

Meeting decided not to include these elements since they should be possible to calculate based on either ShiftKey or time stamps. Secretary is to illustrate possibility to calculate the requested engine times.

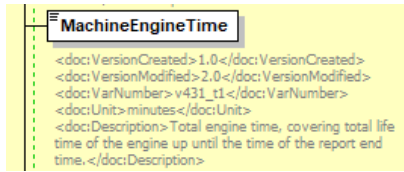
Comments from secretary after the meeting:

ShiftKey is presently not included for each individual work time.

However, there is today the possibility to include a complete time line for when machine is running in the structure IndividualEngineTime (added with version 3.5) as illustrated below:



Also included in the mom-file is the MachineEngineTime:



By combining these two elements as well as ShiftDefinition it is possible to calculate what was requested in the proposal.

NEW SCHEMA FOR A DELTA-HPR

The issue of introducing a new “delta-hpr” schema has been discussed at several different meetings during 2019 and 2018.

The objective is to make a new lighter schema that can be used in order to avoid re-sending some basic information every time a new hpr is sent from the machine, e.g. if sending a new hpr after each stem or every 5 minutes. This means that a very significant proportion of redundant information is not re-sent over and over again.

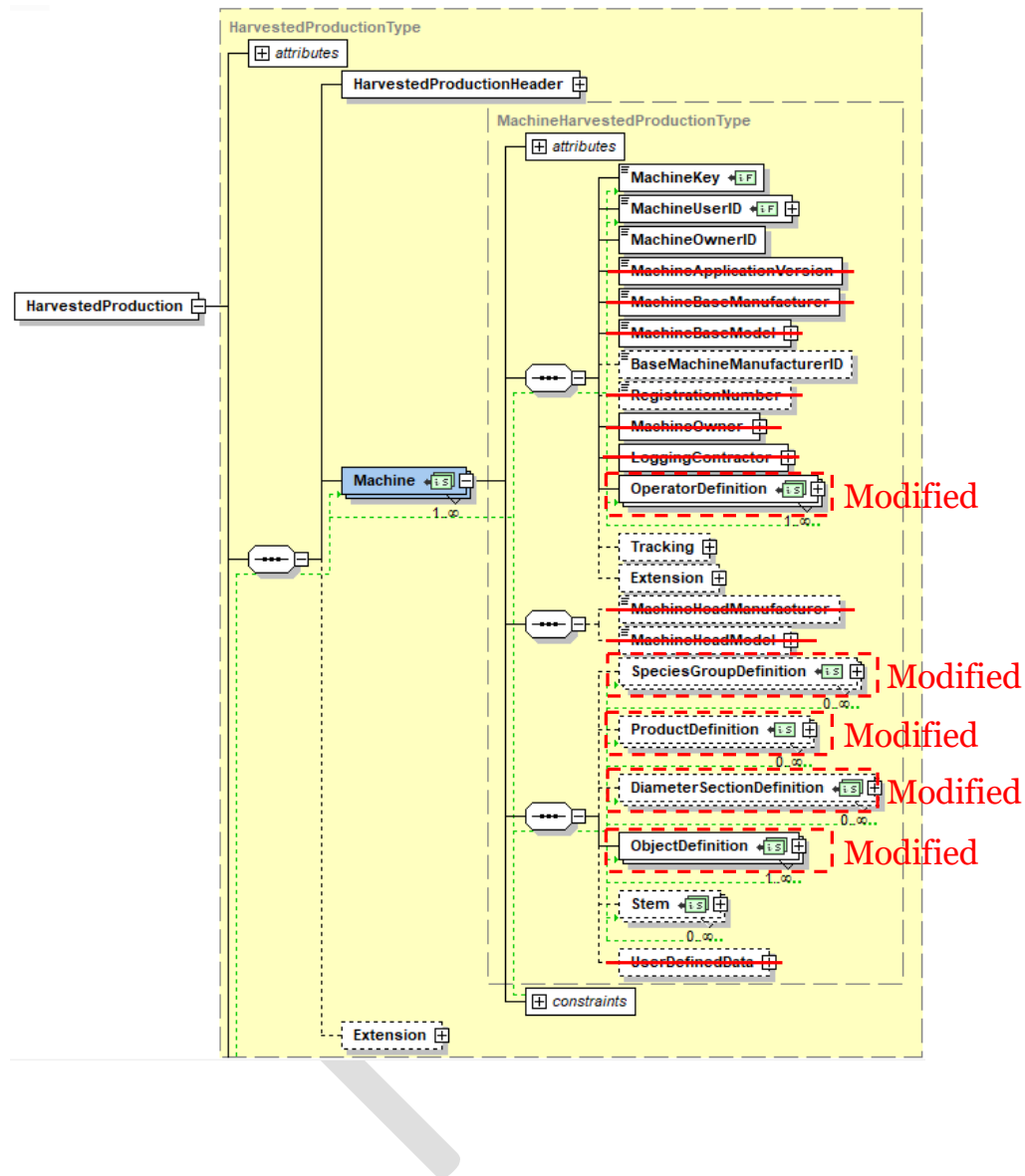
A test was carried out 2018 where a “normal” hpr-file with two stems was converted into a delta-file by excluding SpeciesGroupDef, ProductDef and DiameterSectionDef. The consequences on file sizes are illustrated below:

☒		2 stems.hpr		2018-09-14 10:08	HPR File	1 180 KB
☒		2 stems.zip		2018-09-14 10:08	ZIP Archive	42 KB
☒		2 stems_Delta.hpd		2018-09-14 10:07	HPD File	8 KB
☒		2 stems_Delta.zip		2018-09-14 10:08	ZIP Archive	3 KB

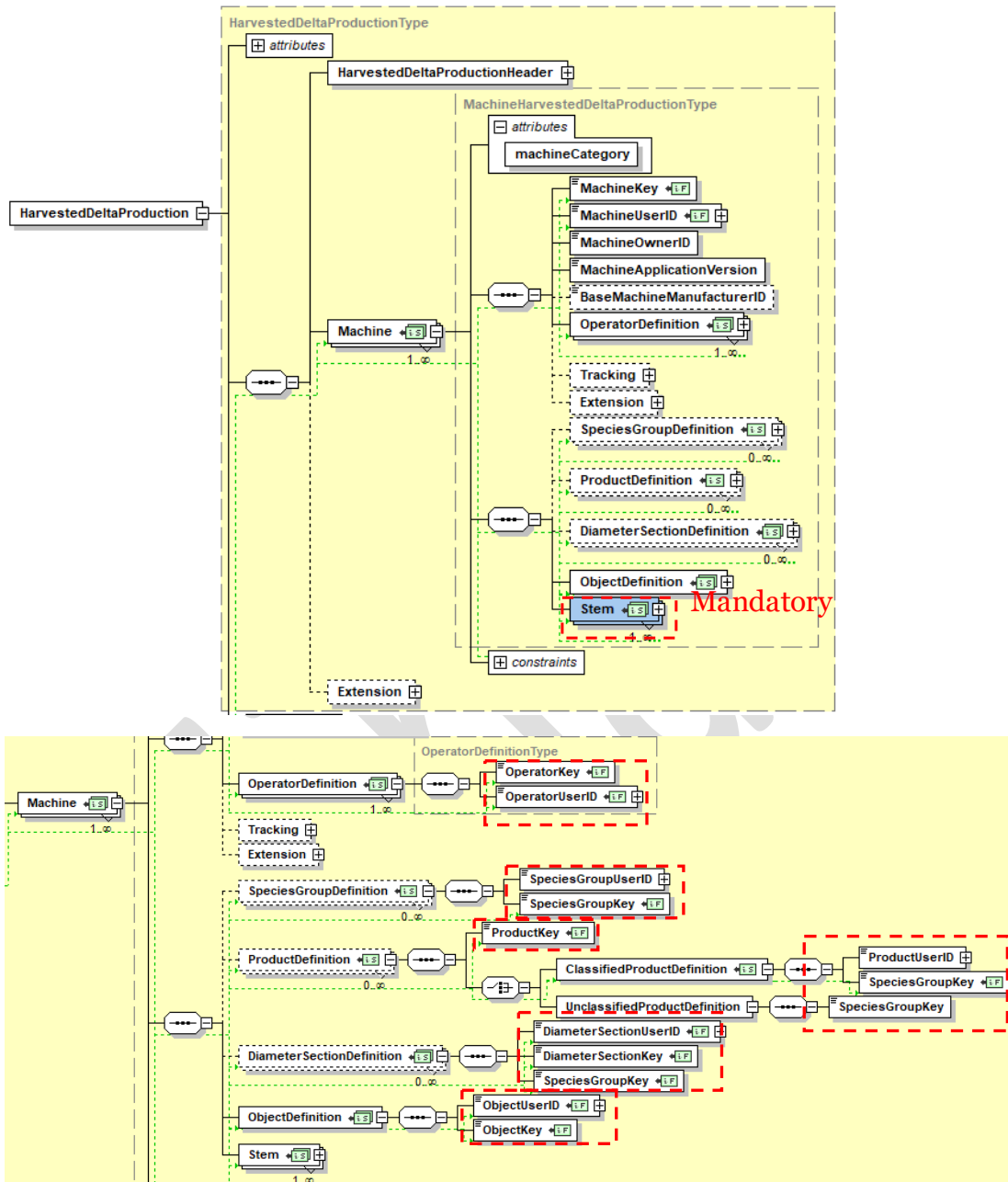
It was decided at the last meeting (2019-04-3—04) to:

- Update the presented beta schema in order to make a decision at the next meeting.
- Update the beta schema in order to include UserIDs (Product, SpeciesGroup, Object etc.).

The following figure illustrates the modification done to the hpr-structure in order to create a new hpd-structure:



Based on the decisions at the previous meeting it was suggested that we create a new hpd-schema according to the following two figures:



It was also suggested that the meeting strongly recommends that the following reporting method is used when reporting hpd.files in order to also communicate the complete definitions of Objects, Products, SpeciesGroups etc. (stems sent in hpd and ProductDefinitions in hpr):

Stems	File type	Definitions
No stem (start object)	Hpr (1 message)	Complete set of products
Stems 1-937	Hpd (937 messages)	Only ProductUserIDs
No stem (end object)	Hpr (1 message)	Complete set of products

It was decided with the minutes that the new hpd-schema is identical with the hpr-schema with the only modification being that the constraints requiring some optional definitions are excluded (Product / SpeciesGroup / DiameterSectionDefinitions). Some examples of these excluded constraints below:

```
<xsd:key name="ProductKeyProductDefinition">
  <xsd:selector xpath="sfd:ProductDefinition"/>
  <xsd:field xpath="sfd:ProductKey"/>
</xsd:key>
<xsd:keyref name="ProductKeyRefSingleTreeProcessedStemLog" refer="ProductKeyProductDefinition">
  <xsd:selector xpath="sfd:Stem/sfd:SingleTreeProcessedStem/sfd:Log"/>
  <xsd:field xpath="sfd:ProductKey"/>
</xsd:keyref>

<xsd:key name="SpeciesGroupKeySpeciesGroupDefinition">
  <xsd:selector xpath="sfd:SpeciesGroupDefinition"/>
  <xsd:field xpath="sfd:SpeciesGroupKey"/>
</xsd:key>
<xsd:keyref name="SpeciesGroupKeyRefProductDefinition"
refer="SpeciesGroupKeySpeciesGroupDefinition">
  <xsd:selector xpath="sfd:ProductDefinition/sfd:ClassifiedProductDefinition"/>
  <xsd:field xpath="sfd:SpeciesGroupKey"/>
</xsd:keyref>
```

This makes it possible to include Product / SpeciesGroup / DiameterSectionDefinitions in the hpd when needed (typically when a product has been updated and a new ProductKey is generated in the harvester)

A zip-file, including beta schema and example files, was distributed with the minutes.

FELLER-BUNCH QUALITY CONTROL

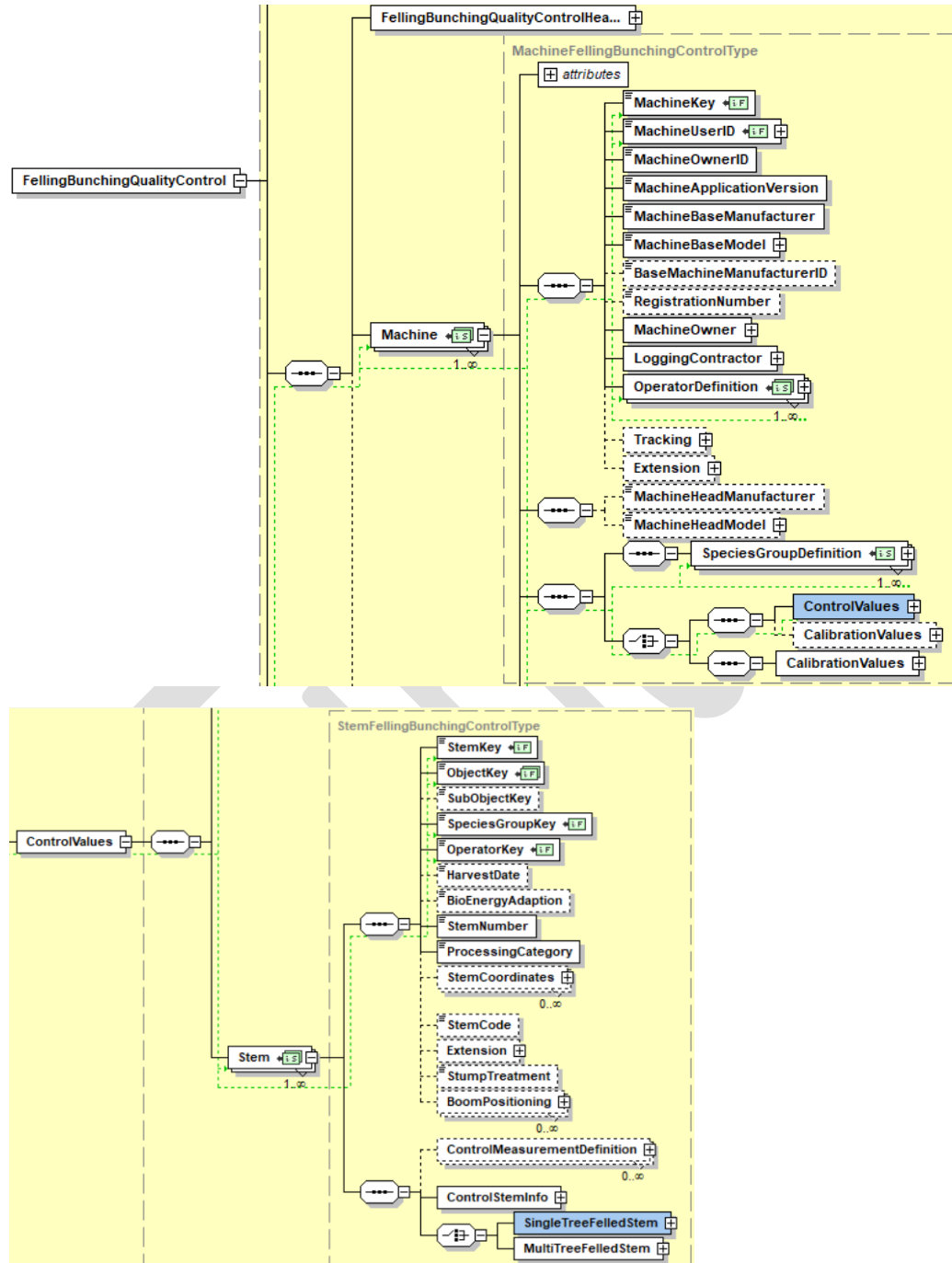
Jeremy Gibson and Ian Wilson 2019-07-01

It has been suggested by Jeremy Gibson and Ian Wilson that we create a new draft schema for quality control of feller-buncher measurements (ReferenceDiameter).

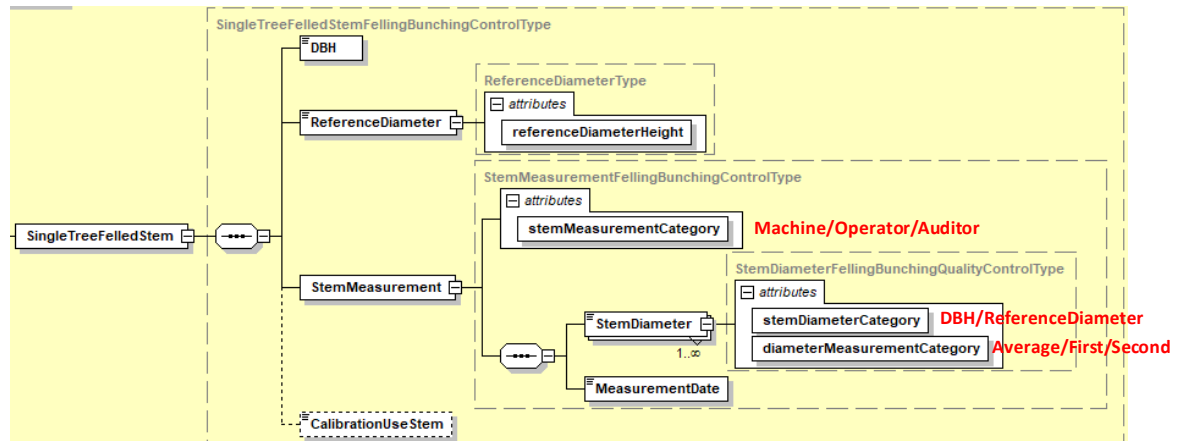
The main objective is to make it possible to do a manual measurement of the ReferenceDiameter and DBH since these are the only “real” measurement values included in the bpr-file.

The idea is to use exactly the same methods for selecting control stems in a feller buncher as in a harvester. This means that we will use basically the same structure for the bq (feller-buncher) as for the hqc (harvester).

Below are two illustrations of the basic structure for a new control message (bqc). The main difference when comparing with the hqc being that the ProductDefinition is excluded and the SingleTreeHarvestedStem is replaced with the Multi-/SingleTreeFelledStem.



The control measurement data is to be registered using the following structure:



It was decided to add a new bqsc schema according to previous description. The following new elements are to be added to the standard:

Name	DataType	Unit	Description
MessageCategory			Enumeration list of file extensions of StanForD 2010 messages: Allowed value in <u>Feller-buncher Quality Control</u> message is: " <u>bqc</u> ".
<u>StemMeasurement</u>			<u>Structure for control measurements per stem.</u>
<u>stemMeasurementCategory</u>	<u>String</u>	<u>Enumeration list</u>	<u>Type of stem measurement. Allowed values: "Machine", "Operator" and "Auditor"</u>
<u>StemDiameter</u>	<u>nonNegative-Integer</u>	<u>Mm</u>	<u>Measured diameter of felled stem</u>
<u>stemDiameterCategory</u>	<u>String</u>	<u>Enumeration list</u>	<u>Enumeration list describing how stem is measured: DBH and ReferenceDiameter</u>
<u>diameterMeasurementCategory</u>	<u>string</u>	<u>Enumeration list</u>	<u>Enumeration list, allowed values: "Average", "First" and "Second"</u>
<u>CalibrationUseStem</u>	<u>Boolean</u>	<u>True/false</u>	<u>Manually measured control stem accepted for calibration use, only registered in caliper</u>

The following beta schemas were distributed with the draft minutes:

- FellingBunchingQualityControl_Beta.xsd
- StanForD2010CommonDefinitions_Beta_Bqc.xsd

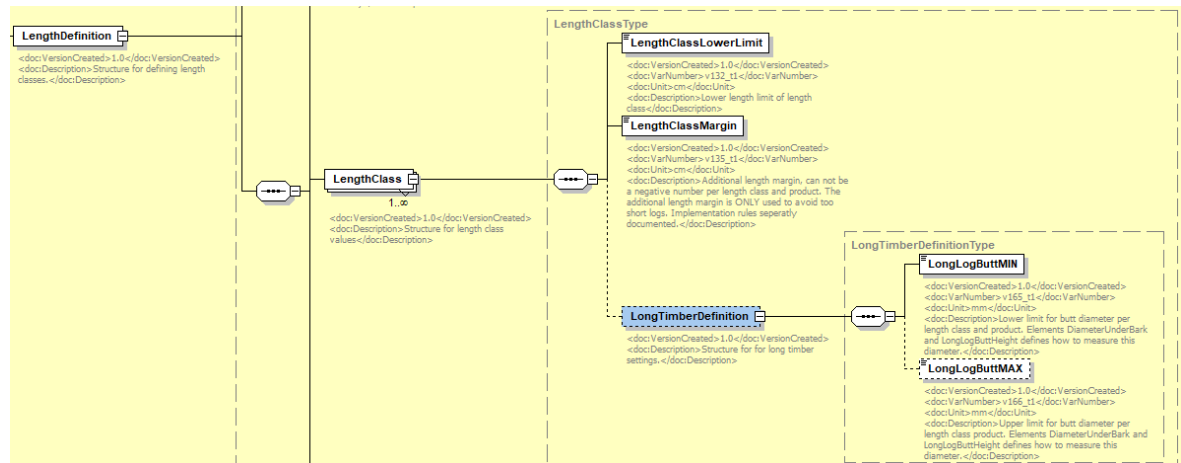
No objections were raised after the meeting. It is thus decided with the minutes to include this new schema with the "Pre-release version 3.6".

§ 5 Proposals for version 4.0

LONGTIMBERDEFINITION

Issue noted by Peter Sundlöf (2019-08-20) and again raised by Jonas Byström, Norra skogsägarna, and Stefan Bohlin, Mellanskog (2019-10-09).

The LongTimberDefinition exists for each length class as illustrated below:



It was noted by both Jonas and Stefan that these parameters in some cases are causing problems. The basic problem is that that in several administrative systems the default value for LongLogButtMAX is 0 mm.

Basic settings Matrices Company information Restrictions File identity

Length (cm) Max 590

Diameter (mm) Max top 600 Max but 700 Min top 260

Cutting window (cm) Lower 3 Upper 5

Price Distribution Limitation Color Pole

Distance from butt cut (cm) 0

Butt diameter limit (mm)

L	MIN	MAX
340	0	0
370	0	0
400	0	0
430	0	0
460	0	0
490	0	0
520	0	0
550	0	0

In most control systems, but not all, the value 0 is interpreted as null. However, in at least two systems this has been interpreted as 0 mm which means that no logs can be cut since all logs have diameters >0.

It is therefore important that all administrative applications make it possible to view and edit the LongTimberDefinition. It is also suggested that the element

LongLogButtMAX is never included in the pin-file if it has the value 0. Both control systems where this was a problem have been updated so that value 0 is never to be considered. The default value should probably be equal to DiameterMAXButt as illustrated below:

The screenshot shows a software interface with several tabs: Basic settings, Matrices, Company information, Restrictions, and File identity. The 'Matrices' tab is active. It contains several input fields and a table.

Length (cm)
Max: 590

Diameter (mm)
Max top: 600
Min top: 260
Max but: 700 (circled in red)

Cutting window (cm)
Lower: 3
Upper: 5

Price Distribution Limitation Color Pole

Distance from butt cut (cm)
0

Butt diameter limit (mm)

L	MIN	MAX
340	0	700
370	0	700
400	0	700
430	0	700
460	0	700
490	0	700
520	0	700
550	0	700

It was decided that the datatype of LongLogButtMAX is changed to positiveInteger in version 4.0.

It was pointed out by secretary that the following guidelines should be followed when implementing LongTimberDefinition:

- Must be possible to view and edit LongTimberDefinition.
- LongLogButtMAX never included in pin-file if value 0 (optional).
- Value 0 (zero) interpreted as null.
- Default value equal to DiameterMAXButt

FORMAT OF USERIDS

Heikki Komulainen, Ponsse (2019-08-20)

Ponsse have had several problems with UserID format over the last few years. The SF2010 implementation is database based and some of these issues are associated with reserved characters of databases, some of these are bugs, and there is also a few times when incoming message contains “invalid” userID. Some examples:

- Whitespace characters before or after the actual userID value
 - Our systems removes the whitespaces
- UserID value contains only whitespaces (one or more)
 - → Our system removes whitespaces, so result is empty string
 - In UI this value looks empty, even we do not remove the whitespace
- UserID contains database reserved characters like percentage or underscore.
 - These characters affects problems when doing database level comparison of two userIDs
- Character casing (uppercase/lowercase) issues.
 - This was our own bug, SF2010 already defines that userid comparison is case intensive.

Of course, we (can) handle all of these issues in way or another in our code, but some other manufacturer may do it different way so in long run it is much better if SF2010 schemas contains some more accurate constraints.

We do not have any ready proposal of constraints yet, but at least length of the userid and allowed/prohibited characters would be good to define.

A possible restriction for UserIDs was illustrated by Henrik Persson:

```
<xs:simpleType name="Tokenized500Type">
  <xs:restriction base="xs:string">
    <xs:pattern value="\S+(\ \S+)*"/>
    <xs:maxLength value="500"/>
    <xs:minLength value="1"/>
  </xs:restriction>
</xs:simpleType>
```

The meeting agreed that it would be an advantage to try to find some good solution for enforcing stricter rules on the “string format”. An additional reason for this is that UserID are sometimes also used for creating file names. However, adding new restriction cannot be done within major version 3 but would have to wait until we implement a major version 4. It might be a problem with existing forest company pin-databases if this is implemented.

- It was decided with the minutes that we add the following text to the description of all UserIDs as well as to the rules document:
*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), /, \, |, *.*

DATA TYPE FOR TRACKINGKEY

Heikki Komulainen, Ponsse (2019-08-20)

Data type is not set in TrackingKey element under TrackCoordinatesType. The data type must be xsd:positiveInteger as all other key elements.

This is probably one of these issues that cannot be implemented within major version 3 but would have to wait until we implement major version 4.

It was decided that the datatype of TrackingKey is changed to positiveInteger with version 4.0.

§ 6 Items for discussion

ANALYSES OF “LOGISTIC BARK FUNCTION

Björn Hannrup, Skogforsk, has analysed the possibility of using the logistic bark function for birch in Sweden. The preliminary report is so far only in Swedish. The following text is based on this preliminary report.

A significant proportion of the harvested volumes from thinning consists of birch in Sweden. Up to 18% of the harvested volumes consists of birch in the south of Sweden (Södra skogsägarna). In first thinnings the proportion increases slightly to 19%. Today this is a significant limitation in using harvester measurements for paying forest owners since the presently used bark functions gives systematic errors that are deemed to be too high. A maximum of 10% birch is allowed when using harvester measurements for payment.

In order to analyse the existing functions as well as studying possible new functions, a total of 221 birch trees were sampled and measured by a number of harvester auditors from the wood measurement associations Qbera and Syd (today Biometria) in the southern half of Sweden.

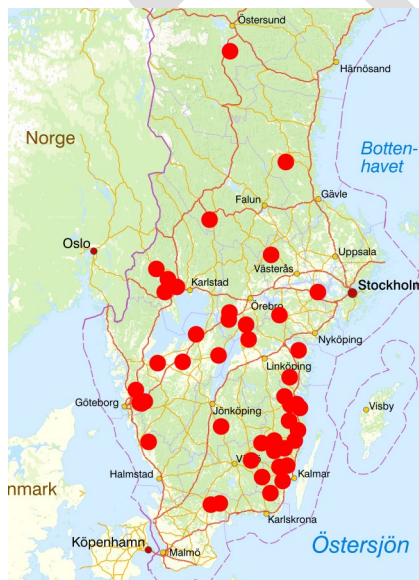


Figure 1. Map illustrating where birch trees were sampled.

Table 1. Statistical key figures for sampled areas and trees.

Variable	N	Mean	Std. dev.	Min.	Max.
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Latitude (°N)	46	58.2	1.3	56.3	62.8
Longitude (°O)	46	14.8	1.5	12.1	17.1
Age (years)	216	49	18	20	100
Breast height diameter (mm)	220	201	68	61	423

The double bark thickness was measured at the butt and top end of each log as well as at breast height.

Two different types of bark functions were evaluated, a logistic and a logarithmic function. The logistic function is identical with the function implemented in StanForD2010 version 3.4 (2019-02-06) with element LogisticTypeBarkModel.

Logistic function

db = double bark thickness, mm

D = diameter on bark, cm

H = height in stem (distance from the stump cross section),m

$$[7] \quad db = \frac{a_3}{1 + (\frac{a_3}{a_1} - 1)e^{(-a_2 H)}} + (\frac{b_3}{1 + (\frac{b_3}{b_1} - 1)e^{(-b_2 H)}})D + \varepsilon$$

Logarithmic function

db = double bark thickness, mm

dbh = diameter at breast height on bark, mm

h = height in stem (distance from the stump cross section), cm

$$[4] \quad db = \alpha_0 + \alpha_1 dbh + \alpha_2 dbh^2 + (\beta_0 + \beta_1 dbh) \ln(h) + \varepsilon.$$

Parameter values for the logistic function were estimated using very advanced techniques based on an iterative process which includes the Levenberg-Marquard algorithm. Estimating the parameters of the logarithmic function is much simpler using regression techniques.

It can be noted from the table below that the systematic differences for the whole material are on the same levels for both functions using parameters estimated in the study while the original parameters from 2014 does not work very well on Swedish birch (generate underestimates).

Table.5. No of observations, systematical error (bias) and random deviation (*RMSE*) for deviation between measured and calculated double bark thickness with functions developed in this study as well as logistic function where birch parameters according to Petruskas (2014) was used.

Indata	Function	n	bias (mm)	RMSE (mm)
All measurements	Logistic, Parameters 2019	1364	0.09	5.55
All measurements	Logarithmic, Parameters 2019	1364	0.00	5.54
All measurements	Logistic, Parameters Petruskas m. fl. 2014	1364	2.19	5.95

However, as illustrated below, there are large differences in the bias when analysing trees divided up into different dbh-classes for the logistic function. The bias for small trees below 12 cm is very high. This is a problem since around 16% of the harvested birch volume in thinnings is cut from trees below 12 cm (southern Sweden). This proportion is around 25% in 1st thinnings. With a bias of 2.5 mm we will overestimate the volume under bark with approximately 6% for trees below 12 cm.

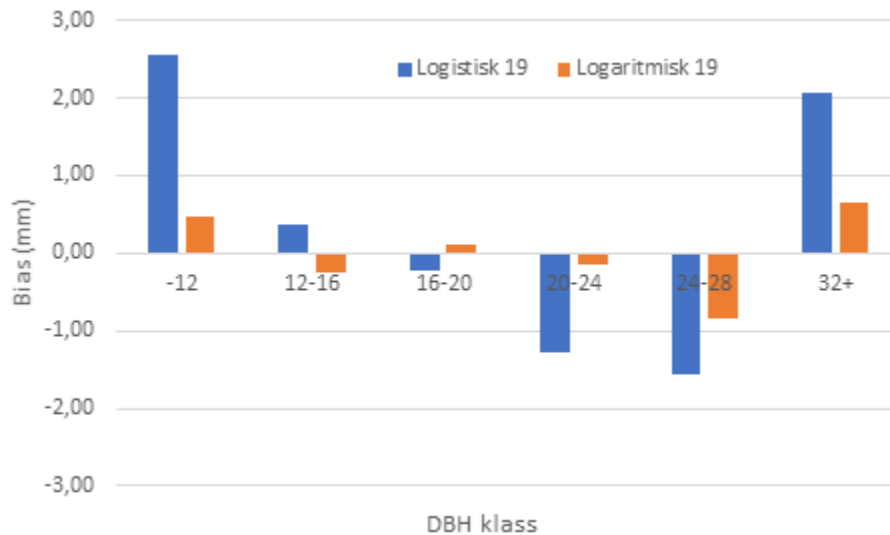


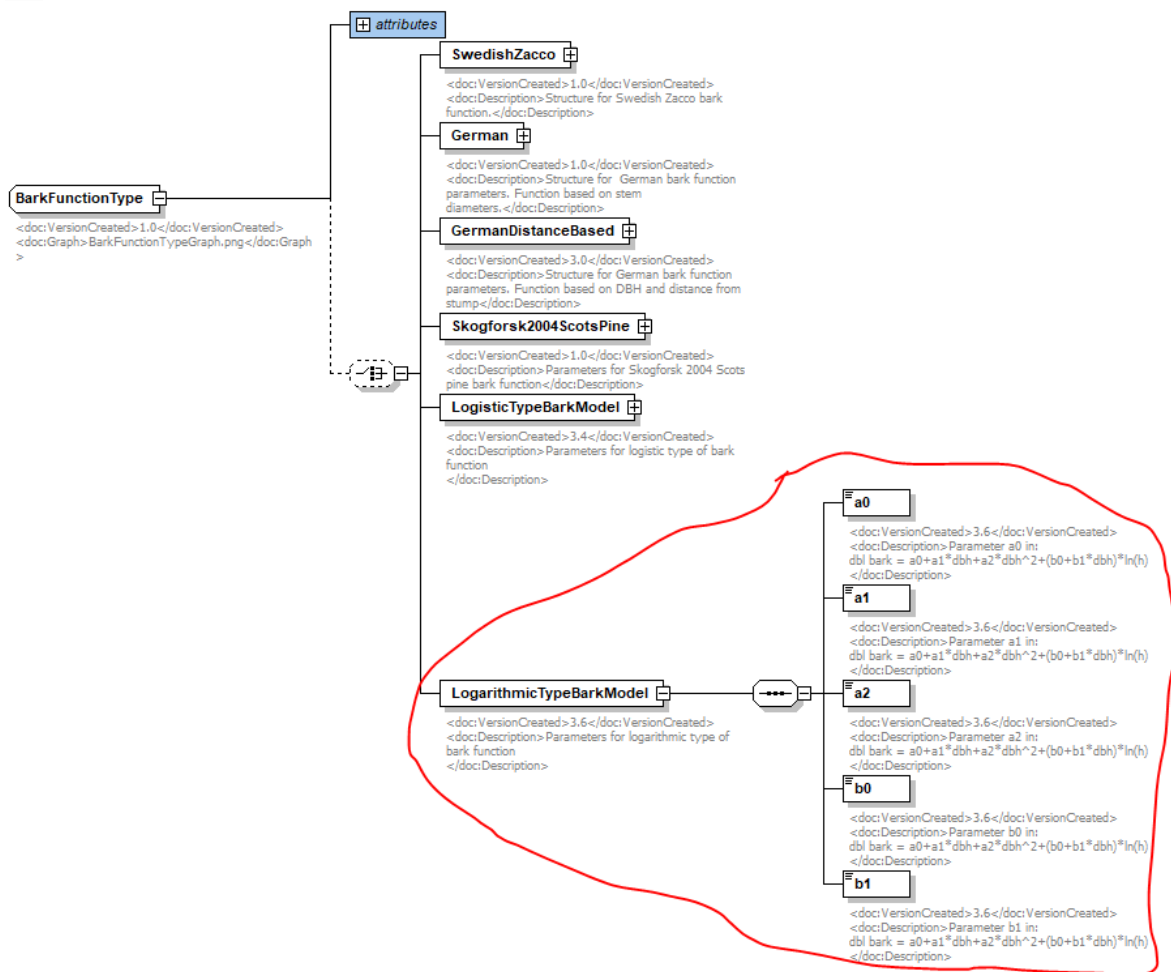
Figure 9. Systematical error (bias) per DBH-class for the logistic and logarithmic function (2019).

In Sweden today the bark function for scots pine (Hannrup 2004) is commonly used for birch. This function gives a small bias for small trees while it gives significant bias on large trees (+5.6% on m³sub) above 30 cm at breast height.

It was for the following reasons suggested that we implement the logarithmic bark function for birch as an additional bark function:

- No bias in any size classes
- Much simpler to estimate new parameters (PhD degree in statistics not needed)
- Possible to start using harvester measurements on a wider scale where volumes are payed per m³ under bark

It was thus suggested that we add a new structure for logarithmic bark functions under BarkFunctionType as illustrated below:



The data type for all elements a0-b1 are to be “decimal”.

Name	Data type	Unit	Description
LogarithmicTypeBarkModel			Parameters for logarithmic type of bark function
a0	decimal		Parameter a0 in: $dbl\ bark = a0 + a1 * dbh + a2 * dbh^2 + (b0 + b1 * dbh) * \ln(h)$ dbl_bark: double bark thicknes, cm dbh, diameter at breast height, mm h: height frum stump, cm
a1	decimal		Parameter a1 in: $dbl\ bark = a0 + a1 * dbh + a2 * dbh^2 + (b0 + b1 * dbh) * \ln(h)$ dbl_bark: double bark thicknes, cm dbh, diameter at breast height, mm h: height frum stump, cm
a2	decimal		Parameter a2 in: $dbl\ bark = a0 + a1 * dbh + a2 * dbh^2 + (b0 + b1 * dbh) * \ln(h)$ dbl_bark: double bark thicknes, cm dbh, diameter at breast height, mm h: height frum stump, cm
b0	decimal		Parameter b0 in: $dbl\ bark = a0 + a1 * dbh + a2 * dbh^2 + (b0 + b1 * dbh) * \ln(h)$ dbl_bark: double bark thicknes, cm dbh, diameter at breast height, mm h: height frum stump, cm
b1	decimal		Parameter b1 in: $dbl\ bark = a0 + a1 * dbh + a2 * dbh^2 + (b0 + b1 * dbh) * \ln(h)$ dbl_bark: double bark thicknes, cm

			dbh, diameter at breast height, mm h: height from stump, cm
--	--	--	--

The meeting discussed general problems with bark functions, focusing on the risk of having an ever increasing number of functions.

The meeting decided to let Skogforsk consider the following ideas before the meeting 2020-02-07:

- Add parameters c0 and c1 and "c0*d+c1*d^2" to the suggested function in order to also include the Zacco and Austrian bark functions. This would mean implementing the following type of function:

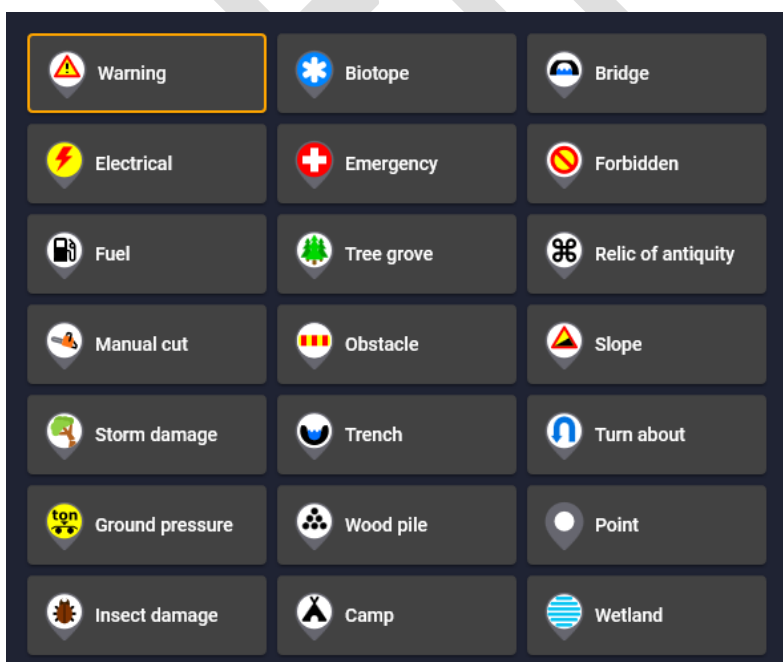
$$dbl\ bark = a0 + a1 * dbh + a2 * dbh^2 + (b0 + b1 * dbh) * \ln(h) + c0 * d + c1 * d^2$$
- Check if this can replace the functions for ScotsPine and Spruce
- Add attribute "barkModelID" as free text in order to make it possible to have a simple way of identifying different types of implementations such as for example: "Zacco, Austrian, Logarithmic etc.

GEOGRAPHICAL INFORMATION AND OGI IN STANFORD

Standardized map symbols

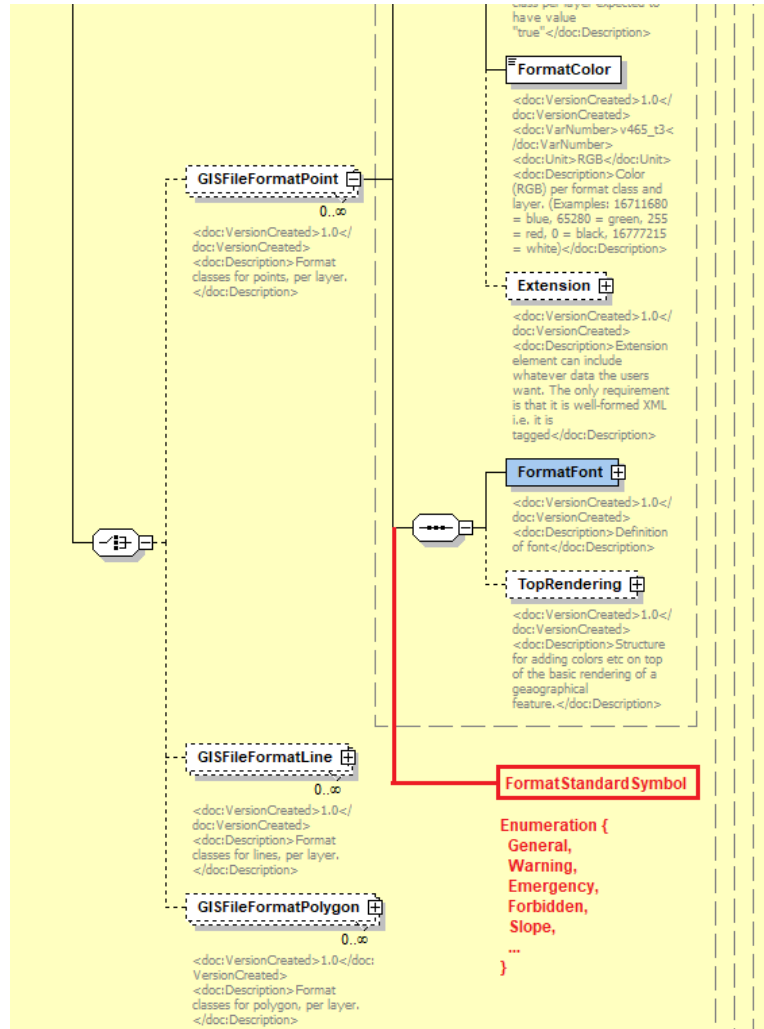
Niclas Eriksson, 2019-10-28

Niclas has pointed out that using the font files for distributing symbols is quite complex and often causes problems. Having a standardized set of symbols using the e.g. svg-format would be a significant advantage. A possible set of symbols are described below.



How to go about when needing additional non-standardized symbols?

This could probably be handled by adding a new element `FormatStandardSymbol` as illustrated below where the value in the element is to be a code, the symbol in itself is not distributed:



Mapping of Koalas

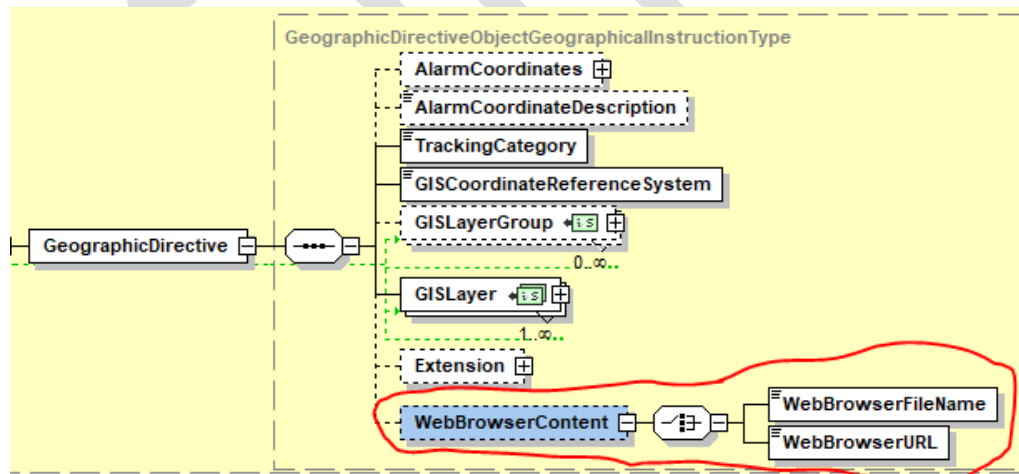
Ian Wilson, 2019-10-29.

Areas where Koalas prefer to sleep is an important factor when harvesting in Australia due to strict regulations. Drones are sometimes used on a daily basis in order to find these areas to avoid killing the koalas during harvesting. Sending out simple updated maps including “koala areas” would be an advantage.



General information

Today general information concerning logging of a site is included in a pdf. A way of making it possible to fully integrate this information into a GIS application could be to add a new structure as illustrated below. The idea being that we use some format commonly use by web browsers, either as html or as a url.



← → ↻ 🔒 https://test.forestlink.se/harvesting-directive/traktdirektiv.xml



Traktdirektiv

Slutavverkning

Grunddata

Leverantörsnamn Bengt Persson	Fastighet STÄLLET 13:2	Leverantörens telefonnummer 070-9876543
Leverantörens adress Gatan 12, 12345 Staden	Köparens adress Skogsbolagsgatan 10, 12345 Köping	
Planerare Bengt Persson	Planerarens telefonnummer 070-1234567	Objektnummer 12345
Virkesorder 12345678	Larmkoordinat Northing (sweref99) 7038658	Larmkoordinat Easting (sweref99) 707217

Instruktioner

Apteringslista 59BR	Areal 5,4 ha	Total volym 1304 m3f	Medelstam 0,314
Antal fröträd 12	Stolpar ☒ Ja, 10 m3f ☐ Nej	Ved ☒ Ja, 10 m3f ☐ Nej	Grotanpassas ☐ Ja ☒ Nej

Beskrivning



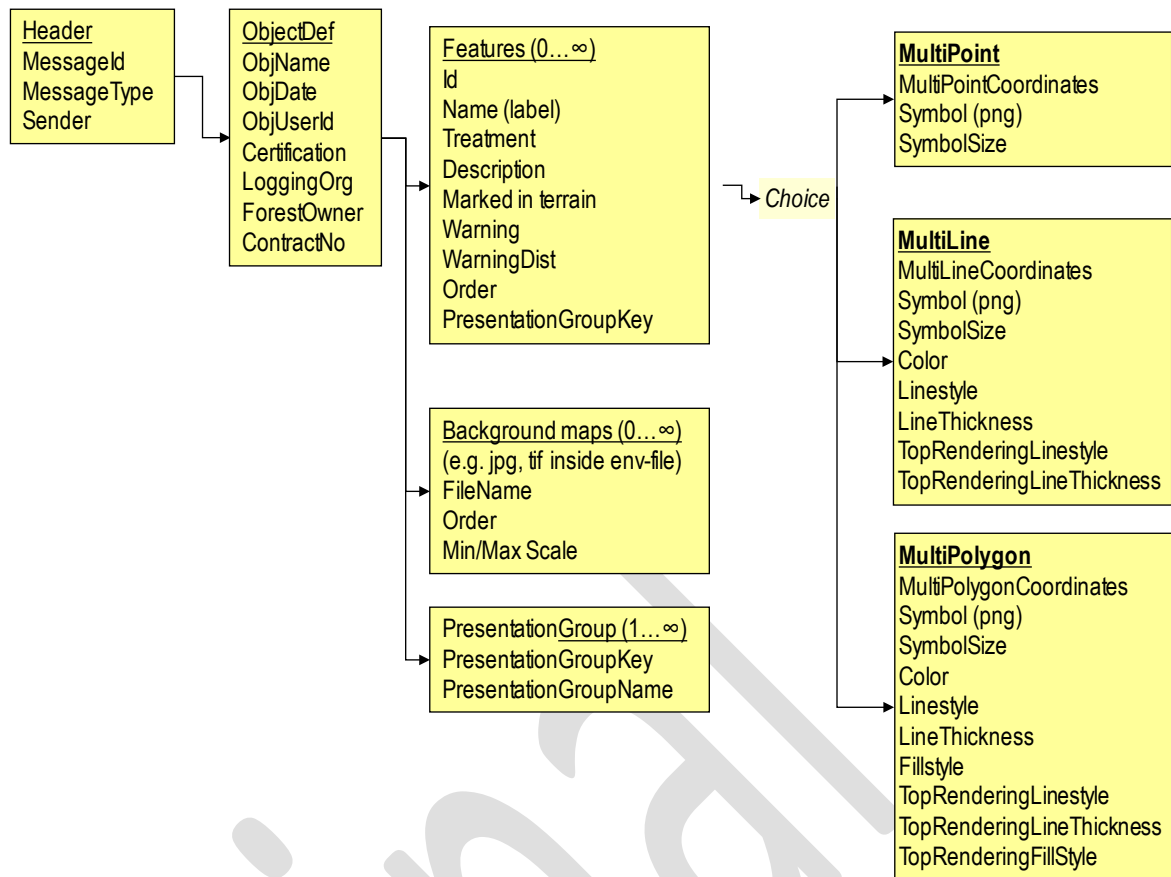
Re-modelling ogi?

John Arlinger, 2019-11-03.

Based on the issues raised above as well as some work on developing some ogi-test-files the secretary started to think about the possibility of re-modelling the ogi-schema.

Today the ogi (and old ghd) are based on working with other “standards formats” like font-files, shp/dbf/shx-files etc. It is necessary to include a number of additional files inside an envelope. This makes it quite complex to work with the ogi.

Maybe we should think about re-modelling the ogi by making it possible to include all basic geographical features inside StanForD2010 as well as opening up for utilizing pre-defined “StanForD-symbols” as suggested by Niclas. A possible new structure is illustrated below.



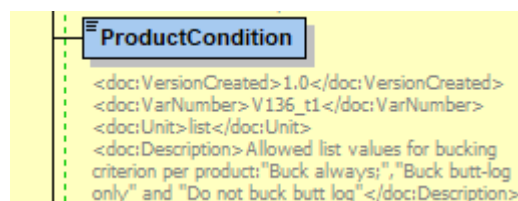
We avoid problems: encoding, dbf-files created for other pruposes, registering font-files in client application.

The meeting decided to let the secretary develop a proposal for the next meeting.

BUCKINGCONDITION

Ian Wilson, 2019-10-15

Some Australian forest company wants to do something a little bit different. To cut a long story short, they are looking into using the StanForD Bucking Conditions (v136 t1) in the Apt file and specifically the “2 = Butt butt-log only” and “3 = Do not buck butt log” options as they have some Products that this feature might be of assistance for. In this part of the world, the use of option 2 and 3 is very rare, so due to this, hardly anyone located in Australasia would know the inner workings of how it works i.e. what constitutes it being a **Butt Log** or **Not being a Butt Log** ?



Due to our faster growing trees and the type of tree species we have, quite often the first section of the stem needs to be bucked off due to some sort of damage/defect (typically this piece will be less than 1m long). This piece would get recorded as a product called Waste (we always set a product called Waste in the Apt file, but set the matrix so that the optimiser will never automatically try to cut it)...If a piece of Waste is the 1st piece to be cut from the stem, then would this piece be classified as the Butt Log ?

As this forest company has a number of different harvester controller brands/models operating, potentially this function might operate differently for each manufacturers controller. Ian has contacted some manufacturers to check how a “butt log” is defined.

The preliminary answers received by Ian per manufacturer are included below.

LogMate:

- If the 1st piece that is cut off the stem is <10cm long, then the 2nd piece will be considered the Butt Log
- If the 1st piece that is cut off the stem is >10cm long, then the 2nd piece will be considered a Non Butt Log
“Butt distance” 10 cm is hard coded.

Dasa:

- If the 1st piece that is cut off the stem is <50cm long, then the 2nd piece will be considered the Butt Log
- If the 1st piece that is cut off the stem is >50cm long, then the 2nd piece will be considered a Non Butt Log
Settable “Butt distance” in Forester.

Komatsu:

- If the 1st piece that is cut off the stem is <100cm long, then the 2nd piece will be considered the Butt Log
- If the 1st piece that is cut off the stem is >100cm long, then the 2nd piece will be considered a Non Butt Log
Butt distance 100 cm is hard coded.

Ponsse:

- If the 1st piece that is cut off the stem is <150cm long, then the 2nd piece will be considered the Butt Log
- If the 1st piece that is cut off the stem is >150cm long, then the 2nd piece will be considered a Non Butt Log
Butt distance is settable.

John Deere

Unkown

Technion

Unkown

LogSet

Unkown

Parker

- If the 1st piece that is cut off the stem is <100cm long, then the 2nd piece will be considered the Butt Log
 - If the 1st piece that is cut off the stem is >100cm long, then the 2nd piece will be considered a Non Butt Log
- Butt distance 100 cm is hard coded.

No detailed definition of a butt log could be found when the secretary studied old minutes from when this parameter was added and clarified (1996, 2001 and 2006)

The meeting decided to

- Add to description of ProductCondition:
By default all logs with a starting point within 100 cm from stump cut are "butt logs". Settable in machine. Registered in ButtLogMAXStartHeight.
- Add optional element for "ButtLogMAXStartHeight" to SpeciesGroupDefinition.

Name	Data type	Unit	Description
ProductCondition	string	List	Allowed list values for bucking criterion per product:"Buck always;","Buck butt-log only" and "Do not buck butt log" <i>By default all logs with a starting point within 100 cm from stump cut are "butt logs". Settable in machine. Registered in ButtLogMAXStartHeight.</i>
ButtLogMAXStartHeight	Non negative integer	Cm	<i>Defines the maximum start height where a log is to be considered. E.g. if this value is 100 cm all logs having their butt cut below 100 cm must be considered a butt log. This element has an effect if BuckingCondition has value "Buck butt-log only" or "Do not buck butt log"</i>

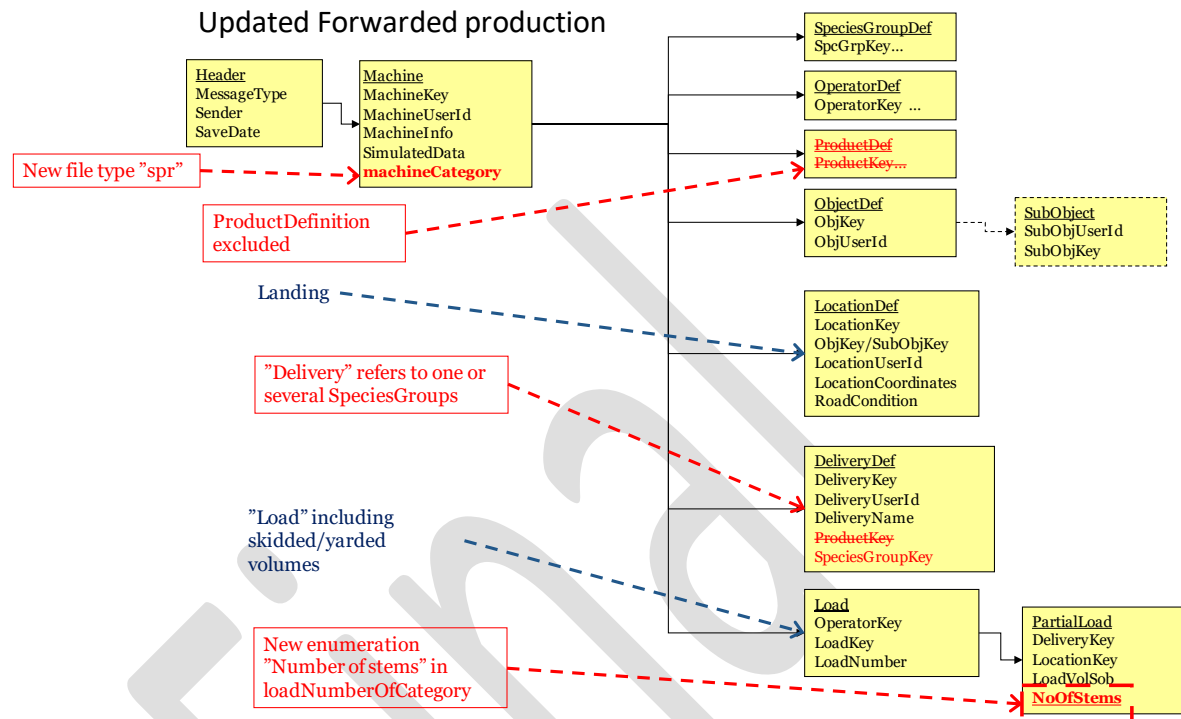


YARDER AND SKIDDER MESSAGES, STEM FORWARDING

Jeremy Gibson and Ian Wilson, 2019-07-01

It has been suggested by Jeremy Gibson and Ian Wilson that we discuss new draft schemas for yarders and skidders.

The old production proposal for skidders from 2018 is illustrated below.



The idea is to keep the original fpr-structure including Location, Load, PartialLoad, SpeciesGroupDefinition and Delivery.

It is suggest that we rename Delivery, Load and PartialLoad into StemDeliver, StemLoad and StemPartialLoad since these would be different than the definitions in the fpr-schema.

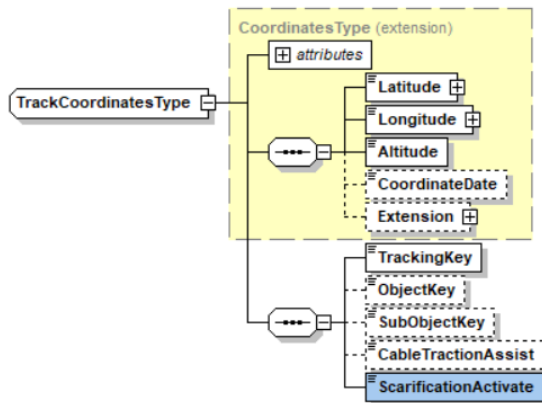
It is deemed not to be any significant difference between yarders and skidders. We could therefore use the same schemas for both types of machines. Maybe using the term "StemForwarding" in order to cover both types of machines

It was decided to let the secretary create draft schemas after the meeting that could be distributed to and discussed with relevant actors. This issue will be discussed at coming meetings.

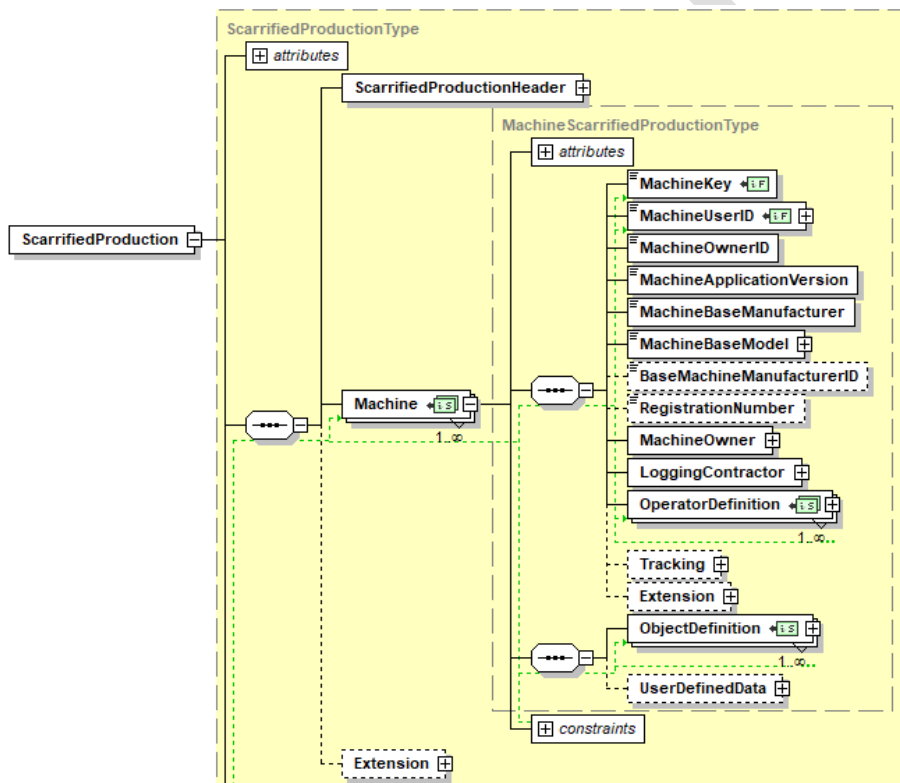
MESSAGE FOR SCARIFICATION

Ian Wilson, 2019-10-15

Ian has raised the issue of whether it would be possible to utilize StanForD2010 for registering scarification. A quite simple solution could be to update the Tracking structure with an additional element "ScarificationActive" (Boolean).



Creating a new schema based on the hpr but excluding StemDefinitions, ProductDefinitions, DiameterSectionDefinitions, HeadModel and SpeciesGroupDefinitions is probably quite simple. Basically all input data needed for a scarifier is included in the ObjectDefinition which can be found e.g. in the oin/foi/ogi



It was suggested that a draft schema is created after the meeting that could be distributed to and discussed with relevant actors.

The meeting decided not to create a new schema. It was instead decided to let the secretary look at a possibility of including this in the re-modelling of ogi and ogr.

§ 7 Implementation issues

NEW FOREST MACHINE COMMUNICATION METHODS

Background

The possibility of including new communication methods within the StanForD framework has been discussed at StanForD meetings as well as meetings with Swedish forest company representatives during the last year.

The main driving forces behind the development of standardized APIs are:

- Weaker security with old OS
- New functionalities with modern OS (e.g. SenderXC)
- 3rd party applications in control system creates friction
- Cloud solutions for access to harvester exists today...but no standard solution
- Freedom to choose OS in control system (e.g. Linux)

The main conclusions from the discussion at the last StanForD meeting (3rd-4th of April 2019) were:

- Simpler and more secure communication methods are needed. This includes both local forest machine and cloud communication.
- A solution without 3rd party applications in control system are preferable.
- Same type of interface (APIs) must be available both locally in forest machine and in a cloud service (server).
- Access to machine specific interface in cloud communication is to be "owned" by machine owner. No new legal relationship between manufacturer and forest company shall be needed.

Workshop 2018-08-28, Main conclusions

The following conclusions were summarized after the workshop.

1. *There was consensus (more or less) that APIs are needed. Main reason from manufacturer's point of view was to decrease the need for third party softwares to be installed on machine control system.*
2. *There was consensus (more or less) that APIs should be based on standard internet protocols (no alternative to https, REST, SSL was discussed)*
3. *There was consensus (more or less) that APIs should be as platform- and environment independent as possible (e.g. machine or remote/cloud)*
4. *There was a discussion whether APIs should support file transfer only or if data API functionality should be included from start. We assessed the majority to prefer to start with a file API and a data API as a second step. Data APIs requires more time and work with the specifications and developing and testing the backend systems.*

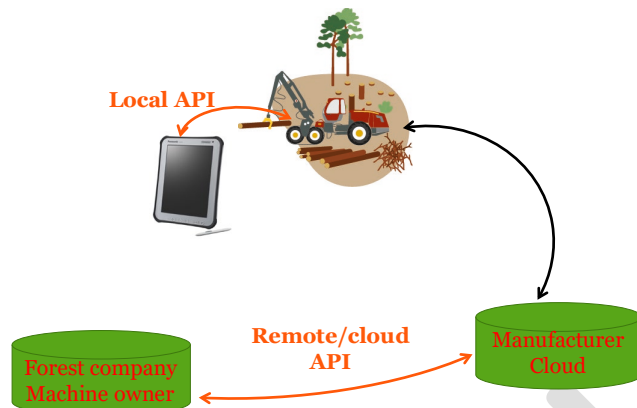
5. *There was a discussion whether the APIs should support other formats/ standards (e.g. JSON) and other data than normally handled by StanForD (e.g. machine status). We assessed the majority to prefer to start with StanForD-format and StanForD-data only.*
6. *There was a discussion where to implement the APIs (e.g. machine or cloud). The meeting did not agree on a preferable general setup but both solutions are probably highly relevant. However, this might not be critical for agreeing on an API standard since the objective is to create an identical API for both implementations.*
7. *Manufacturers foresee new problems related to third party hardware and network access. From user perspective, online support (e.g. using TeamViewer) can be an issue. However, the meeting agreed (more or less) on that new problems are expected to be fewer and less severe.*
8. *There was consensus (more or less) that access control is a major challenge. This includes definition of stakeholder rights, legal issues as GDPR and how to handle privileges technically and practically. When a data API is considered, there will be difficulties to define messages and information filtering.*
9. *There was a discussion on the need for data validation where some argued for the necessity of data validation to be performed in on-board computers whereas others were pointing out other approaches. Since this this would be a requirement that potentially lower the benefit from the API, its an important issue to address by the project group*

Other comments and terminology

It is worthwhile to point out that the following API terms will be used:

- File API, an API for extracting a StanForD file conforming to the StanForD2010 schemas.
- Data API, an API for extracting a dataset based on the StanForD2010 standard but that may only include a subset of data comparing to the complete schemas.
- Local API, an API used for communication between device inside machine and control system of machine.
- Cloud / Remote API, an API used for communication with a server/cloud outside machine.

The differences between local and remote APIs can be illustrated in the illustration below.



Observe, as stated previously, that there should not be any significant differences between local and remote APIs.

There are significant advantages with a remote API (cloud-to-cloud) but for historical and practical reasons it is highly likely that Local APIs are more attractive on many markets.

”Security” includes several different aspect that needs to be considered:

1. Encryption/Transport (e.g. SSL)
2. Authentication (identification of client, e.g. certificate or login)
3. Authorization
 - partitioning of data, e.g. mom vs hpr / hpr from forest company A vs company B
 - granularity e.g. including operator id and time stamps or not

Next step

It was decided that a smaller group responsible for creating a draft proposal is formed with the following participants:

John Arlinger, Skogforsk
 Juha-Antti Sorsa, Metsäteho
 Håkan Westman, Biometria
 Jonas Thorsson, Dasa
 Heikki Komulainen, Ponsse
 Niclas Eriksson, Komatsu
 Henrik Persson, LogMax
 Ari Ronkainen, UPM
 Janne Kokkonen, John Deere

The group will:

- Start out with creating a proposal for a file-API (both local and remote).
- Study solutions for data-APIs.

Create a road map to be presented at the next StanForD meeting.

BOARD FEET AND OPTIMIZATION ON THE US WEST COAST

Limited amount of new input into this issue since last meeting. Updating the standard or suggesting new methods must be done in close cooperation with relevant actors in the US.

The secretary studied the possibilities of using m^3 top for value optimization based on a board feet table and a price matrix. It is probably possible method, at least if the focus is on logs measured only as one “segment” (lengths below 20 or 40 feet).

STANFORD 2010 NOMENCLATURE

No language updates suggested after last meeting.

TIME SCHEDULE FOR IMPLEMENTATION OF STANFORD2010

Harvesters

The following table for harvesters was compiled in September 2019 (specify latest minor version that has been or is planned to be implemented).

Manufacturer	Present software version released on the market	Last StanForD-version supported	Lower versions not supported
Opti (Ponsse)	4G 4.750	3.1	2.0 or lower
Timbermatic (JohnDeere)	H 2.1.24	3.4	2.0
LogMate (LogMax)	2.0.29	3.3	< 2.0
MaxiXplorer (Komatsu)	3.19	3.3	Presently not 3.2
DasaForester	1.5	3.2	<2.0
Motomit (Parker)			
xLogger (Technion)	7.51	3.3	< 3.0
TOC 2 (LogSet)	3.172	3.0	< 3.0
DP II (Haglöf)	7.17	3.x	<1.0
Silvia7 (CGI)	2018.2.0.4	3.3	<=2.0
SenderXC (SDC)	1.10	3.5	<=2.0

Implemented functionality	Opti	Timbermatic	Log-Mate	Maxi-Xplorer	Dasa-Forester	Motomit	xLogger	TOC 2
Updating of product (pin) during harvesting? Restart not needed.	X	X	X	X	X		X	X
Updating of object (oin) during harvesting? Restart not needed.	X	X	X		X		X	
Can ObjectDef.TextToMachine easily be presented to operator? Important when updating oin (pop-up).	X	X	X	X*	X		X	

Can ProductDef.ProductDescription easily be presented to operator? Important when updating oin (pop-up).			X*	X*	X		X	
---	--	--	----	----	---	--	---	--

* Some adjustments remain

Implemented elements	Opti	Timber-matic	Log-Mate	Maxi-Xplorer	Dasa-Forester	Motomit	xLogger	TOC 2
ProductDef.ProductClass	X	X	X		X		X	
Stem.StemCode			X	X				
Machine.Tracking (gps-log)			(X)	X				
SingleTreeProc.Reversing			X					
Stem.BoomeAngle		X		X	X(Rottne)			
ModificationRestricted		X*	X	X	X		X	
UDI				X				

* Some adjustments remain

Implemented for multi tree processing	Opti	Timber-matic	Log-Mate	Maxi-Xplorer	Dasa-Forester	Motomit	xLogger	TOC 2
Calculated "true" length and top diameter per log. <u>NOT measured values based on total log bunch.</u>	X	X(-)	X		X		X	
Calculated "true" DBH based on reference diameter. <u>NOT measured values based on total stem bunch.</u>	X	X	X	X(-)	X		X	

Forwarders

The following table for forwarders was compiled in September 2018 (specify latest minor version that has been or is planned to be implemented).

Manufacturer	Present software version released on the market	Last StanForD-version supported	Lower versions not supported
Opti (Ponsse)	4G 4.750	3.1	2.0 or lower
Timbermatic (JohnDeere)	H 2.1.24	3.4	2.0
LogMate (LogMax)	No forwarder application		
MaxiXplorer (Komatsu)	3.19	3.3	Presently not 3.2
DasaForester	1.5	3.2	<2.0
Motomit (Parker)	No forwarder application		
xLogger (Technion)	No forwarder application		
TOC 2 (LogSet)	No forwarder application		

Implemented file types	Opti	Timber-matic	Maxi-Xplorer	Dasa-Forester	Motomit	xLogger	TOC 2
Forwarding instructions (foi and fdi)?	X (only scale)	X	X				

§ 8 StanForD2010 projects

USE OF STANFORD2010

No presentations due to running out of time.

FELLER-BUNCHER IMPLEMENTATION

No presentations due to running out of time.

§ 9 Other issues

No other issues.

§ 10 Next meeting

Skype meeting for going through final minutes 2020-01-10, 10.00 CET

StanForD skype meeting 2020-02-06, 09.00 CET

Ordinary StanForD meeting 2020-05-06--07, Vantaa

§ 11 End of meeting

Johan thanked everyone for their participation.

Final