

papiNet Forest Wood Supply & Bioproducts

Use Case 05 Harvesting and forwarding of logs in the forest

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2. FWS Use Case 05 - Harvesting and forwarding of logs in the forest

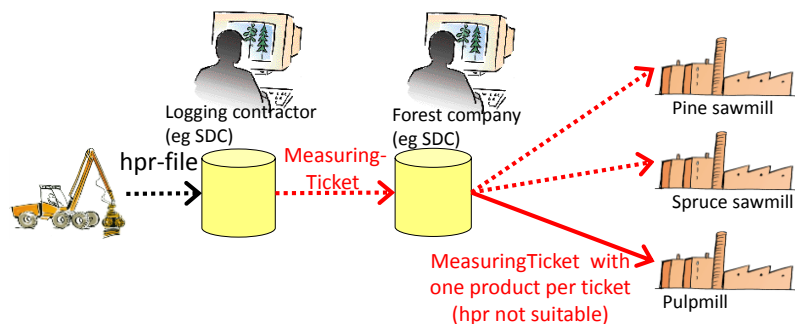
2.1 Objectives

The objective of this document is to give an introduction to how StanForD2010 data can be converted into papiNet E-documents. Observe that the document does not include a complete information chain with a large number of papiNet E-documents sent between several different business partners. The examples only illustrate separate information exchanges that may occur in many different information chains.

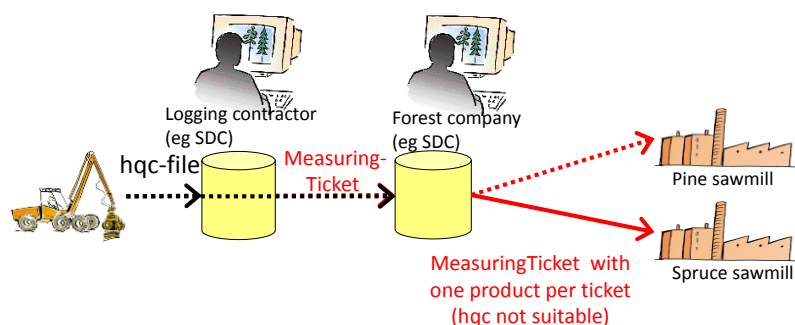
2.2 Overview

The Forest Company is harvesting and forwarding (to roadside) logs for different mills. The Forest Company is the buyer of the logging services. Both harvester and forwarder report their production on a regular basis to the Forest contractor and the harvester also reports quality control data based on randomly selected control stems automatically selected by the harvester itself.

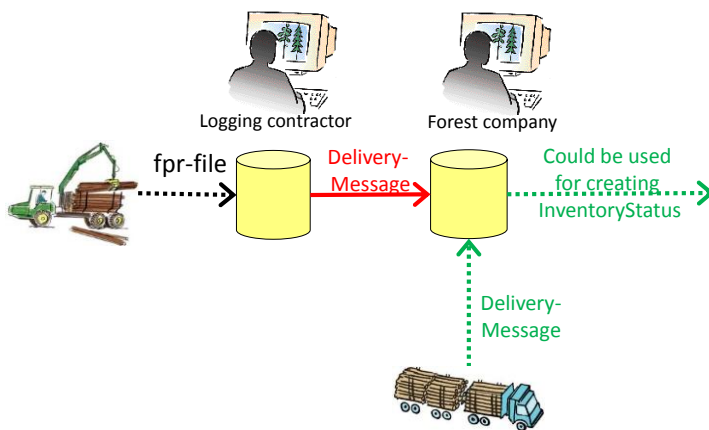
The harvester production data (hpr) is converted by the Forest contractor to a **MeasuringTicket** and sent to the Forest Company. The Forest company can use it to inform the relevant mill what is to be delivered or for to plan future transportation.



The harvester quality control data (hqc) is converted by the Forest contractor to a **MeasuringTicket** and sent to the Forest Company. The Forest company can use it to inform the relevant mill what to expect regarding accuracy of harvester measuring data. The industry may also use this information in order to measure the same control logs again if marking of logs with e.g. RFID has been implemented. RFID information not included in the present example.



The forwarder production data (fpr) is also converted by the Forest contractor into **Delivery Message** and it is then sent to the forest company. The Forest company can use this Delivery Message to combine with what has been transported by truck from the roadside in order to create a Inventory Status. The Inventory status can be used for operative planning of transportation from road side.



Observe that the conversion of StanForD files in Sweden is normally carried out by SDC or some other IT provider representing the forest company. The contractor is not allowed to do any manipulations or conversions of data, normally StanForD data is therefore sent directly from forest machines to forest company or their representative such as SDC using some transmission and compression software.

Included in the example xml-files are references to the original StanForD elements used in the conversion to papiNet.

The following xml-exampel illustrates that the SupplyPointCode in the DeliveryMessage originates from the StanForD2010 element LocationUserId:

```
<SupplyPointCode Agency="Supplier">2629-01</SupplyPointCode>
<!--LocationUserId-->
```

The following exampel illustrates that the Identifier in the DeliveryMessage originates from the StanForD2010 elements LoadKey and PartialLoadKey:

```
<Identifier IdentifierCodeType="Carrier" IdentifierType="Primary">241_2</Identifier>
<!--LoadKey+PartialLoadKey-->
```

The following xml-exampel illustrates that the Quantity in the Measuring Ticket originates from the StanForD2010 element LogVolume if the attribute logVolumeCategory has the enumeration value "m3sub":

```
<Quantity QuantityType="SolidWoodVolume" MeasuringMethodType="Automatic" MeasuringAgency="SDC"
MeasuringMethod="m3fub">
<!--LogVolume, logVolumeCategory="m3sub" -->
```

2.3 FWS Case 05 MeasuringTicket for ForestHarvester production data

The Forest Company is selling pulpwood logs to a Pulp Mill. The Forest Company is the buyer of the harvesting services.

The forest harvester sends a StanForD2010 hpr message to a Logging contractor company (could be respresented by IT-services provider eg SDC).

Logging contractor (could be represented by eg SDC) converts the hpr message to Measuring Ticket (type ProductionTicket) which is sent to Forest company.

Forest company sends a Measuring Ticket to the Pulp mill with measuring data from the harvester including only one product.

Scope: The Measuring Ticket contains one product from one logging area. Each stem and log is registered on a separate ItemInfo

Xml example file:

FWS_UseCase05_MeasuringTicket_ProductionTicket_YYYY-MM-DD.xml

2.4 FWS Case 05 DeliveryMessage for ForestForwarder production data

The Forest forwarder is transporting logs from forest to different supplypoints (landings or in StanForD2010 locations). The saw logs are delivered by truck to the saw mill. The delivery could be measured at a measuring location at the saw mill.

The Forest forwarder sends a StanForD2010 fpr message to a Logging contractor, could be represented by IT-service provider such as SDC.

This message is then converted into a DeliveryMessage by Logging contractor (could be IT service provider) before being sent to the forest company.

Forest company then uses the DeliverMessage to update their logistic planning system (inventory status).

Scope: Two loads must be registered on two separate line items with a product and a supply point where the load has been unloaded. Each unique combination of supply point (destination) and product must be registered as a separate line item. Each load is registered individually per PackageInformation.

Xml example file:

FWS_UseCase05_DeliveryMessage_ForestForwarding_YYYY-MM-DD.xml

2.5 FWS Case 05 MeasuringTicket for ForestHarvester quality control data

The Forest Company is selling saw logs to a Saw Mill. The Forest Company is the buyer of the harvesting services.

The forest harvester sends a StanForD2010 hqc message to a Logging contractor company (could be represented by IT-services provider eg SDC).

Logging contractor (could be represented by eg SDC) converts the hpr message to Measuring Ticket (type CalibrationCheckLog) which is sent to Forest company.

Forest company sends a Measuring Ticket to the Saw mill with control measuring data from the harvester including only one product.

Scope: The Measuring Ticket contains all control measured logs belonging to one product from one logging area. Each log is registered on a separate ItemInfo and each type of measurement (harvester, operator and auditor) is registered in separate MeasureingTicketSequence.

Xml example file: FWS_UseCase05_MeasuringTicket_CalibrationCheckLog_YYYY-MM-DD.xml

2.5.1 Indicating random selection

The propertyType value "IsRandomlySelected" is needed in order to indicate whether a stem was randomly selected by the harvester or if the stem was selected subjectively by the harvester operator.

2.5.2 References between sequences in CalibrationCheckLog

Different measurements (forest harvester, operator, auditor) are stored in separate MeasuringTicketSequences. References between the different MeasuringTicketSequences are based the use of MeasuringTicketReference as illustrated below:

```
<MeasuringNumber>42374hjwt_2009-01-15 11:11:00_1</MeasuringNumber>
<!--MachineKey+CreationData+_1 (M1=harvester measurement)-->

<MeasuringTicketReference MeasuringTicketReferenceType="MeasuringNumber"
AssignedBy="ForestHarvester">42374hjwt_2009-01-15 11:11:00_2</MeasuringTicketReference>
<!--MachineKey+CreationData+_2 reference to Operator (M2) measurement-->

<MeasuringTicketReference MeasuringTicketReferenceType="MeasuringNumber"
AssignedBy="ForestHarvester">42374hjwt_2009-01-15 11:11:00_3</MeasuringTicketReference>
<!--MachineKey+CreationData+_3 reference to Auditor (M3) measurement-->
```

Logs in different sequences are referenced using:

```
<Identifier IdentifierCodeType="Measurer" IdentifierType="Primary">99_2</Identifier>
```

3. Other general issues

3.1 Referencing of stem from log

Below is an example indicating how to include a reference from a log to a stem where the stem identity is included in the TrackingReferenceID for each log:

```
<PackageMeasuringInfo>
<ItemInfo ItemType="Stem">
  <Identifier IdentifierCodeType="Measurer" IdentifierType="Primary">1</Identifier>
  <!--StemKey -->
  <MapCoordinates MapReferenceSystem="WGS84" MapCoordinateType="LatLong">
    <!--StemCoordinates -->
    <Coordinates CoordinateFormatType="Degrees">+59.85143+15.59015</Coordinates>
  </MapCoordinates>
  <PropertyValue PropertyType="TreeDiameterBreastHeight" MeasuringMethodType="Automatic".....
.....
</ItemMeasuringInfo>
<ItemInfo ItemType="Log">
  <Identifier IdentifierCodeType="Measurer" IdentifierType="Primary">1_3</Identifier>
  <!--StemKey+_+LogKey -->
  <TrackingReferenceID ItemType="Stem" TrackingReferenceIDType="Parent">
    <Identifier IdentifierCodeType="Measurer" IdentifierType="Primary">1</Identifier>
    <!--Reference to stem using StemKey-->
  </TrackingReferenceID>
  <!--LogVolume -->
  <Quantity QuantityType="SolidWoodVolume" MeasuringMethodType="Automatic".....
  <PropertyValue PropertyType="DiameterSmallEnd" MeasuringMethodType="Automatic" .....
```

Observe that the stem is registered under PackageMeasuringInfo and not under ItemMeasuringInfo since the stem does not belong to any specific product. This solution also means that there is no need to register the same stem several times if logs belong to more than one product are registered in the MeasuringTicket.

3.2 Referencing original stanford messages

No unique identity per StanForD message exist. However by combining the globally unique MachineKey with the CreationDate from the StanForD2010 files it is possible to create a unique id per StanForD message as illustrated in the examples below:

```
<MeasuringTicketReference MeasuringTicketReferenceType="StanForDHarvestedProductionNumber"
AssignedBy="ForestForwarder">uy42374hgw_2009-01-15 11:11:12</MeasuringTicketReference>
<!--Reference to original hpr file MachineKey+CreationDate. -->
```

```
<DeliveryMessageReference DeliveryMessageReferenceType="StanForDForwardedProductionNumber"
AssignedBy="ForestForwarder">uy42374hgw_200901151111</DeliveryMessageReference>
<!--Reference to original fpr file MachineKey+CreationDate. -->
```

3.3 Using MeasuringMethod for properties and quantities

Attribute MeasuringMethod has the data type s60 (string with 60 characters with no enumeration values). It was decided 2013-05-15 to start out with limiting the MeasuringMethod to national recommendations. No general list for FWS will be compiled. SDC will compile a list for Swedish use based on the present needs in Sweden that will be implemented in the present examples.

List of MeasuringMethods according to SDC in 2014 (vol=volume, ob= on bark, ub=under bark):

Description	UOM MT	QuantityType MT	MeasuringMethod
Solid Wood vol ub	CubicMeter	SolidWoodVolume	M3FUB
Solid Wood vol ob	CubicMeter	WoodVolume	M3FPB
Logpile vol ob	CubicMeter	LogPileVolume	M3T
Logpile vol ub	CubicMeter	LogPileVolume	M3TUB
Vol by top measurement ub	CubicMeter	SolidWoodVolume	M3TOUB
Vol by top measurement ob	CubicMeter	WoodVolume	M3TPB
Vol by mid-point measurement ub	CubicMeter	SolidWoodVolume	M3MIUB
Vol by mid-point measurement ob	CubicMeter	WoodVolume	M3MIPB
Solid vol by top-butt-measurement ub	CubicMeter	SolidWoodVolume	M3TRUB
Solid vol by top-butt-measurement ob	CubicMeter	WoodVolume	M3TRPB
Loose vol	CubicMeter	TippedLooseVolume	M3S
Weight	MetricTon	NetNetWeight	TON
Energy	MegaWattHour	Energy	MWH
Count	Piece	Count	STYCK
Dry Matter	MetricTon	BoneDry	TTV

*Present SDC terminology/nomenclature

The following table describes how to use the SDCs measuring methods when converting StanForD files into papiNet E-documents:

Description	UOM MT	QuantityType MT	Measuring-Method	Comments (element and attribute values in StanForD2010)
Solid Wood vol ub	CubicMeter	SolidWoodVolume	M3FUB	LogVolume, logVolumeCategory="m3sub"* OR LogVolume, logVolumeCategory="m3 (price)" VolumeDiameterCategory="All" VolumeUnderBark=FALSE VolumeLengthCategory="Physical length"
				LoadVolume, loadVolumeCategory="Volume, m3sub"***
Solid Wood vol ob	CubicMeter	WoodVolume	M3FPB	LogVolume, logVolumeCategory="m3sob" OR LogVolume, logVolumeCategory="m3 (price)" VolumeDiameterCategory="All" VolumeUnderBark=FALSE VolumeLengthCategory="Physical length"*
				LoadVolume, loadVolumeCategory="Volume, m3sob" **
Vol by top measurement ub	CubicMeter	SolidWoodVolume	M3TOUB	LogVolume, logVolumeCategory="m3 (price)" VolumeDiameterCategory="Top" VolumeUnderBark=TRUE volumeDiameterTopPostion=10 VolumeLengthCategory="Length as defined in length classes"***
Vol by top measurement ob	CubicMeter	WoodVolume	M3TPB	LogVolume, logVolumeCategory="m3 (price)" VolumeDiameterCategory="Top" VolumeUnderBark=FALSE volumeDiameterTopPostion=10 VolumeLengthCategory="Length as defined in length classes"*
Vol by mid- point measurement ub	CubicMeter	SolidWoodVolume	M3MIUB	LogVolume, logVolumeCategory="m3 (price)" VolumeDiameterCategory="Mid" VolumeUnderBark=FALSE VolumeLengthCategory="Length as defined in length classes"*
Vol by mid- point measurement ob	CubicMeter	WoodVolume	M3MIPB	LogVolume, logVolumeCategory="m3 (price)" VolumeDiameterCategory="Mid" VolumeUnderBark=FALSE VolumeLengthCategory="Length as defined in length classes"*
Loose vol	CubicMeter	TippedLooseVolume	M3S	LoadVolume, loadVolumeCategory=Loose volume**
Weight	MetricTon	NetNetWeight	TON	LoadGreenMass**

*Harvester production data, ** Forwarder production data

In all cases described above VolumeDiameterAdjustment must be equal to "Measured diameter in mm".

How to handle StanForD attribute logVolumeCategory when enumeration is equal to "m3 price"? This is the volume which is used to calculate the total value of a product. The most important use for this volume is when optimizing how to cut a stem into logs in order to maximize the value of the stem. This volume is always included in Quantity while other volumes like e.g. m3sub or m3sob are registered in InformationalQuantity. Observe that StanForD enumeration "m3 price" may include many different types of volumes. It is defined by several different attributes and parameters such as VolumeDiameterCategory and VolumeUnderBark. It has been agreed by SDC and Skogforsk (2013-09-22) to add character "P" to code in MeasuringMethod (code list described in table above).

List of MeasuringMethods, used for registered properties, according to SDC
(MeasuringLocation/trigger is MeasuringLocation/LocationParty/ PartyType/ ForestHarvester):

Description	Property-Type	Measuring-MethodType	Meas.-Agency	Meas.-Method	Comments (element and attribute values in StanForD2010)
Diameter small end under bark	Diameter-SmallEnd	Automatic	SDC	Under-Bark	LogDiameter, logDiameterCategory="Top ub" diameterMeasurementCategory="Average"
Diameter small end on bark	Diameter-SmallEnd	Automatic	SDC	OnBark	LogDiameter, logDiameterCategory="Top ob" diameterMeasurementCategory="Average"
Diameter by mid-point measurement under bark	DiameterMid	Automatic	SDC	Under-Bark	LogDiameter, logDiameterCategory="Mid ub" diameterMeasurementCategory="Average"
Diameter by mid-point measurement on bark	DiameterMid	Automatic	SDC	OnBark	LogDiameter, logDiameterCategory="Mid ob" diameterMeasurementCategory="Average"
Diameter butt end under bark	Diameter-LargeEnd	Automatic	SDC	Under-Bark	LogDiameter, logDiameterCategory="Butt ub" diameterMeasurementCategory="Average"
Diameter butt end on bark	Diameter-LargeEnd	Automatic	SDC	OnBark	LogDiameter, logDiameterCategory="Butt ob" diameterMeasurementCategory="Average"
Length of measured items	Lenght	Automatic	SDC		LogDiameter
Length of measured items	Lenght	Classified	SDC		LogLengthClass
The log order in the steem	TreeLog-Order	Automatic	SDC		LogKey
Code defining the tree species	TreeSpecies-GroupCode	Visual-Estimated	SDC		
Breast height diameter	Tree-Diameter-BreastHeight	Automatic	SDC		DBH
Harvest date	Date-Production	Automatic	SDC		HarvestDate