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Sluttrapport

GJELDER

Norsk sporbarhetsprosjekt 2004: Oppsummering av aktivitetene

BEHANDLING | UTTALELSE | ORIENTERING | ETTER AVTALE

GÅR TIL

Fiskeri- og havbruksnæringens forskningsfond
v/Direktør Terje Flatøy

ARKIVKODE	GRADERING
SFH80 A064084	Åpen

ELEKTRONISK ARKIVKODE

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PROSJEKTNR.	DATO	SAKSBEARBEIDER/FORFATTER	ANTALL SIDER
840129	2005-06-13	J. Story, G. Senneset, E. Forås, K. Fremme	5

1 Innledning

Norsk sporbarhetsprosjekt 2004 ble etablert med utgangspunkt i FHF's strategiplan og i samarbeid med Norges Fiskarlag, Norske Sjømatbedrifters Landsforening (NSL) og Fiskeridirektoratet.

Det ble definert tre delprosjekter:

- Beredskapstest matvaretrygghet
- Implementeringsguider
- Demonstrasjon av kjedesporbarhet

Denne sluttrapporten gir en samlet oversikt over aktiviteter og leveranser i prosjektet, og oppsummerer i tillegg det vi vurderer som viktige områder i forhold til videre forskningsinnsats.

Innhold

2 Hva er utført

2.1 Beredskapstest matvaretrygghet

Hovedtyngden av arbeidet i prosjektet ble utført høsten 2004, og to rapporter ble gitt ut i januar 2005:

- Norsk sporbarhetsprosjekt 2004 Delprosjekt: Beredskapstest matvaretrygghet. Hovedrapport (STF80 A0440099 - Åpen)
- Norsk sporbarhetsprosjekt 2004 Delprosjekt: Beredskapstest matvaretrygghet. Bilagsrapport (STF80 F044098 – Fortrolig)

Arbeidet ble utført av SINTEF i samarbeid med Fiskeriforskning, Norges Fiskarlag og NSL.

Hovedmålet med delprosjektet var å teste sporbarhetsløsningene i industrien, og foreslå tiltak for å forbedre løsningene. Status er kartlagt ved å kjøpe totalt 16 forskjellige fiskeprodukter i flere typer butikker, og deretter forsøke å spore disse tilbake til råvarekilden. For noen av produktene er det også sett på om det er mulig å spore framover i kjeden.

Konklusjoner:

- For de kjedene der sporing er mulig er dette i stor grad basert på at nøkkelpersoner er til stede.
- Informasjonen som viser mottak og leveranser fra/til andre bedrifter (sporing ett ledd fram/ett ledd tilbake) er for en stor del papirbasert og dermed tids- og ressurskrevende å finne fram i. Dette kan medvirke til at et større parti må trekkes tilbake ved en forurensning av produktet, fordi det ikke er praktisk mulig å få fram nok informasjon til å gjennomføre en kirurgisk tilbaketrekning.
- Tracefish-standarden er lite kjent og enda mindre brukt.
- Elektronisk overføring av informasjon mellom bedrifter i en kjede forekommer nesten ikke.

Selv om utvalget av produkter i denne beredskapstesten er forholdsvis lite kan det ikke sies at tilstanden i bransjen er tilfredsstillende når det ikke er mulig å finne råvarekilde(r) for mer enn ca 60 % av produktene.

2.2 Implementeringsguider

Arbeidet med implementeringsguider er utført vinter/vår 2005. Det er lagt vekt på å illustrere hvordan TraceFish-standarden skal brukes i praksis ved å vise informasjonsflyten gjennom to typiske kjeder (villfanget torsk og oppdrettslaks). Det er valgt å beskrive de to kjedene i en felles rapport:

- TraceFish basert innføring av sporbarhet i norsk fiskerinæring (ISBN-13 978-82-7251-585-9).

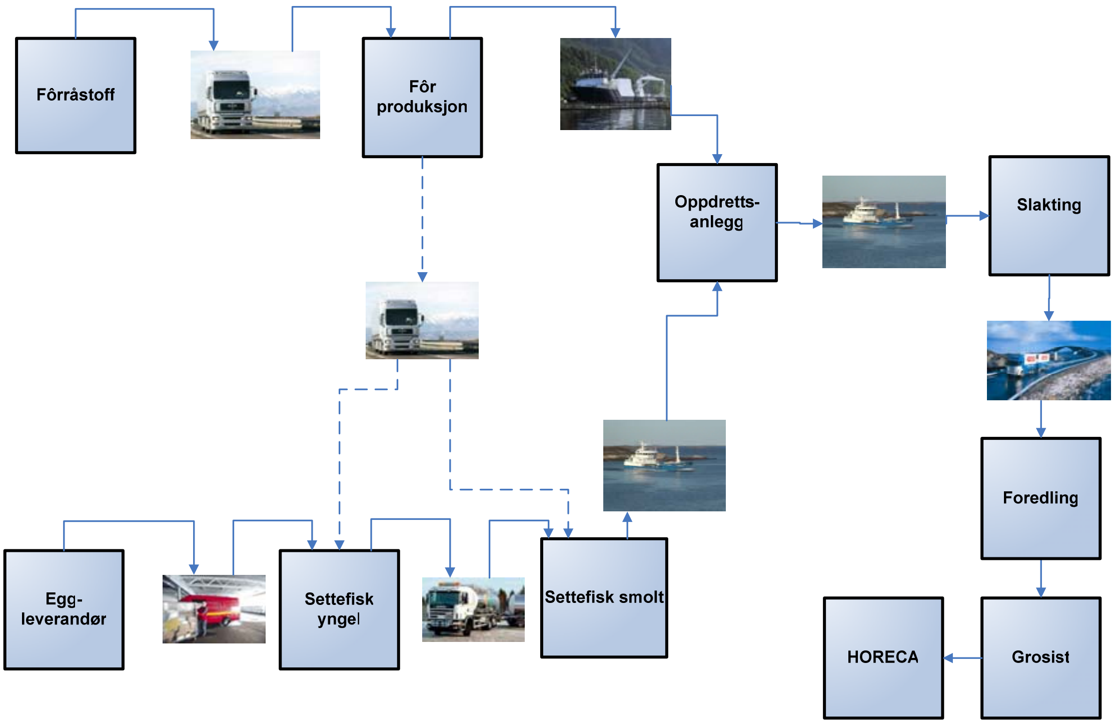
I tillegg inneholder implementasjonsguiden en generell beskrivelse av hvordan sporing i henhold til TraceFish standarden kan innføres i industrien, herunder bl.a.;

- Hvordan definere sporbar enheter
- Hvordan identifisere sporbare enheter

- Hvordan registrere transformasjoner av sporbare enheter (sammenslåing/splitting)
- Hvilke data skal/bør/kan registreres, og hvordan knyttes disse til den sporbare enheten
- Hvordan identifisere de kritiske sporbarhetspunktene
- Hvorfor er standardisering viktig

2.3 Demonstrasjon av kjedesporbarhet

Det gjennomføres flere prosjekter, både norske, nordiske og europeiske, hvor man gjennomfører implementering av sporbarhetssystemer og tester utstyr for datafangst. Midlene fra FHF på dette området viste seg å være for små til å gjennomføre en full demonstrasjon av innføring av kjedesporbarhet. Man valgte derfor å benytte de tilgjengelige midlene til å knytte dette delprosjektet opp mot forskningsprosjektene TelopTrace (finansiert av Norges Forskningsråd) og SeafoodPlus (finansiert av EU/Norges Forskningsråd). Begge disse prosjektene har aktiviteter innenfor kartlegging, analyse og demonstrasjon av kjedesporbarhet. Felles for begge disse prosjektene er kjeden som er vist i Figur 2-1. SeafoodPlus vil senere i prosjektperioden også omfatte kjeder for villfanget fisk.



Figur 2-1 Kjede for oppdrettslaks i Telop Trace/SeafoodPlus

Delprosjektet Demonstrasjon av kjedesporbarhet har dermed inngått som en del av arbeidet med:

- Kartlegging av sporbarhetsløsninger og informasjonsflyt i kjeden fra oppdrettsanlegg til kunde i Frankrike (inkludert transportør)
- Utarbeide forslag til tiltak i denne delen av kjeden
- Utarbeide rapport med forslag til identifikasjon av sporbare enheter, merking av sporbare enheter og hvilken informasjon som skal utveksles elektronisk
- Oppfølging av test av utveksling av data i et elektronisk sporbarhetssystem (fortsatt under arbeid)

Prosjektet Telop Trace fortsetter ut 2006, mens SeafoodPlus avsluttes i 2008.

Følgende rapporter/notater er vedlagt i appendiks som dokumentasjon på arbeidet som er utført i denne sammenheng:

1. Internal project report TELOP Trace
2. Use of EAN-standards for traceability in the TelopTrace project

Kartlegging og re-enineringsrapporten fra TELOP Trace inneholder bedriftssensitiv informasjon sett fra industriens synspunkt og ble på anmodning fra prosjektdeltakerne ikke publisert i prosjektet. Den vedlagte interne rapporten inneholder de viktigste ekstraktene fra prosjektet; herunder;

- Oppdatert sporbarhetsanalyse i laksekjeden med fokus på kjeden mellom fòrråstoff/ingredienser og fram til detaljistleddet
- Spesifikasjon av hvor informasjon går tapt og forslag til forbedringstiltak
- Resultater fra demonstrasjon av en standardisert elektronisk utvekslingsformat
- Erfaringer fra automatisk datafangst i demonstrasjonstester

De 2 rapportene er vedlagt i appendiks.

I Seafood Plus regi gjennomføres det kontinuerlig nye demonstrasjonsøvelser i forbindelse med både datafangst og utveksling av sporingsinformasjon. Bruk av RFID brikker blir ansett som framtidens teknologi for identifikasjon av sporbare enheter. SINTEF Fiskeri og havbruk har testet ulike RFID brikker i de ovenfor nevnte prosjektene, samt i ulike prosjekter i kjøttindustrien. Resultatene viser at teknologien per i dag ennå ikke er ferdig utviklet. For produkter med stort vanninnhold er det særlige problemer med hensyn på lesbarhet på brikkene. Vi deltar nå i forsøk, hvor målet er å komme opp med nye og forbedrede løsninger. Nylig arrangerte vi en internasjonal work shop i Seafood Plus prosjektet, hvor man diskuterte disse utfordringene. I TelopTrace prosjektet ble det foretatt implementering av sporingssoftware i industribedriftene, og det ble utvekslet informasjon. Et av hovedprinsippene i TraceFish standarden er bruken av standardiserte dataelementer, og da særlig standardisert nummerering (identifikasjon) av de sporbare enhetene. I alle demonstrasjonsprosjektene vi har deltatt i til nå har det vist seg å være et problem å få bedriftene til å skifte nummerserier på produktene sine. Av den grunn har demonstrasjonen av standardisert informasjonsutveksling til nå hatt begrenset nytte. Industrien ønsker å iverksette nye prosjekter som kan visse at dette er mulig og synliggjøre nytteverdiene. I det nye prosjektet TRAINS er det et hovedmål å starte med innføring av standard identifikasjon av produktene (jfr. ovenfor nevnte rapport - Use of EAN-standards for traceability in the TelopTrace project). Tilsvarende har man i landbruket planer om å starte opp implementeringsprosjektet e-Sporingsprsjektet, hvor man skal demonstrere sporingsløsninger for kjøtt, korn og frukt/grønt. Ved å få bedriftene til benytte standard nummerserier og harmoniserte data vil både datafangst og datautveksling mellom bedrifter kunne gjennomføres på en langt enklere måte enn i dag.

Internal project report TELOP Trace

March 2006

Prepared by:

Eskil Forås, SINTEF

Gunnar Senneset, SINTEF

Kari M. Fremme, TRACETRACKER

Table of Contents

1. Introduction

This is an internal technical report that sum up deliverables and experience made during the TELOP Trace project 2003-2005.

TELOP Trace is one of 3 pillars in the Norwegian project called TELOP (Norwegian abbreviation for "Technology development for profitable processing of farmed fish".)

The organization and focus area of TELOP and the 3 pillars are shown in Figure 1.

The project has received funding from the research Council of Norway, and the participating companies has contributed with own resources.

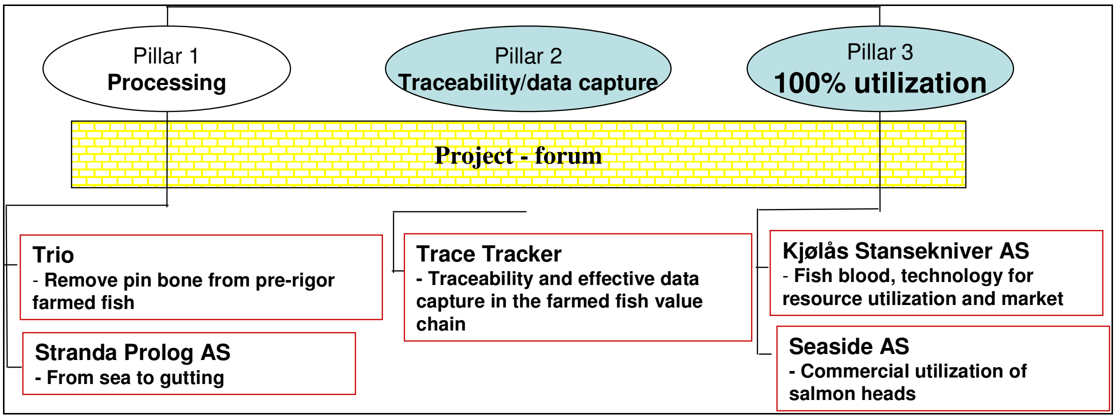


Figure 1 TELOP project pillar overview

The pillar 2, TELOP Trace project, and the project owner TraceTracker aims to develop an online, decentralized exchange of traceability information between independent players along the entire value chain.

The formal project objective was set as:

Contribute to the implementation of EU's chain traceability requirement for food manufacturing by capturing traceability data in the whole value chain for farmed fish. Data capture should be effective and standardized.

This objective would be obtained through the following goals:

- To test different types of advanced technological devices (as sensors, measuring instruments and different types of RFID tags) for the capture of of traceability related information.
- To propose technological improvements based on the above test results and generate product development projects in the companies that deliver data capture devices.

- Through automated and cost-effective processes, develop TraceTracker's system for chain traceability so that the integration to both data capturing peripheral devices and external proprietary systems for internal traceability is effective and user-friendly.
- Strengthen the competitiveness of Norwegian suppliers of technology and equipment in the traceability field.

To fulfil the objective about covering the entire value chain, companies from each link in the farmed salmon chain were invited to take part in the TELOP Trace project. A cluster of companies was assembled over the project period 2003-2005. Some companies/links in the chain were replaced during the project period. The links that finally were included in TELOP Trace are presented in Figure 2 and shows that the project covers a complete supply chain.

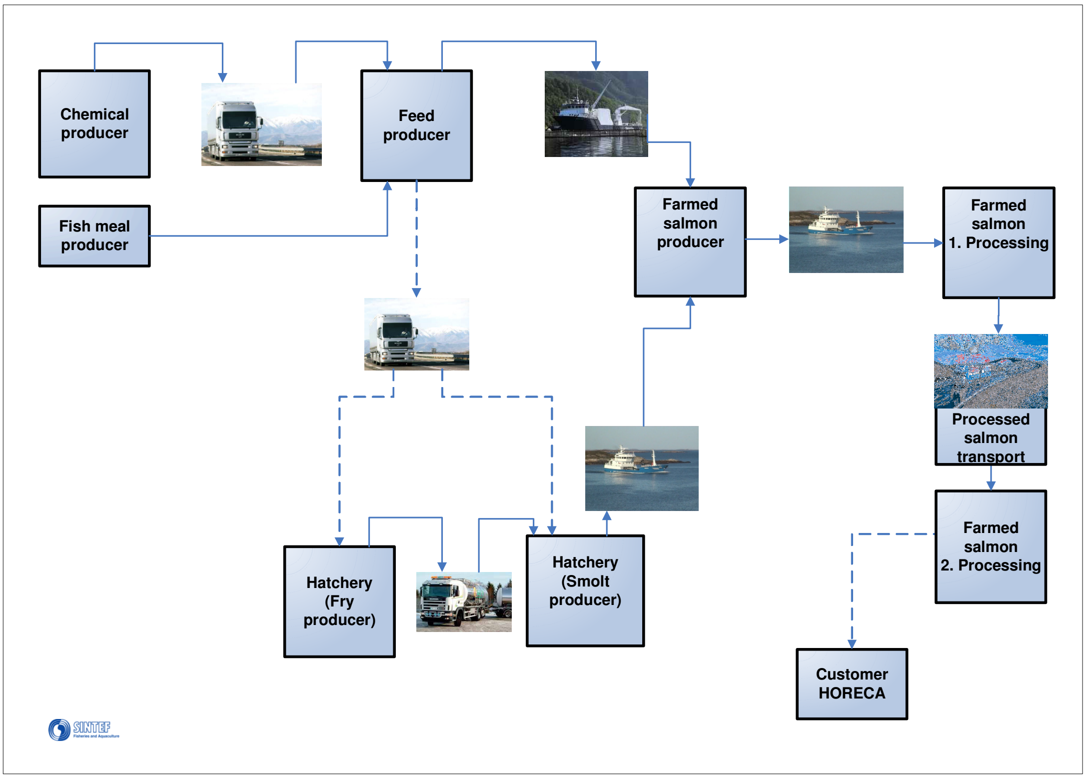


Figure 2 The TELOP trace supply chain

The companies that participated in the project:

Stakeholders in the value chain:

BASF: additives
SKRETTING: feed
FJORD SEAFOOD: fish farming
LMB: salmon filleting
NOR-CARGO TERMO: transportation and logistics

KØLTZOW: Distribution of fine foods
SSP: food service

Research Institutes and Standards:

SINTEF FISHERIES AND AQUACULTURE
FISKERIFORSKNING
EAN Norge (now GS1)

Technology partners:

Willett: Labeling and RFID technology
Akvasmart: IT systems for production control
Maritech: IT systems for production control
TraceTracker: IT systems for internal and global traceability

1.1 Definitions

Internal traceability

Internal traceability is traceability information within a company or location (Figure 3). In terms of a product it relates to the origin of materials, the processing history, and the distribution of the product after delivery.

Chain traceability

Chain traceability is traceability information sent between food business operators. (Figure 3) and depends on the presence of internal traceability in each link.

The principles of chain traceability and internal traceability are shown in Figure 3. The processes in each company are based on the CSCMP[1] definitions. The transport links in the supply chain are not shown in this figure, but carriers are equally important and need to record how traceable units are transported through the chain.

One of the basic prerequisites for traceability is the unique identification of locations and traceable units. In TELOP Trace, the term 'traceable unit' is used as a common denotation for the smallest unit that may be traced between processes or companies. Examples can be trade units, logistic units or production batches of raw materials, semifinished products and finished products.

As a basis for chain traceability, the identities for traceable units must be recorded at reception and shipping (see top vertical arrows in Figure 3). Internally in each link in the chain, raw materials are processed in one or more steps to finished products. Note that both external and internal returns should be recorded.
The use of automatic data capture is vital for obtaining chain traceability. Manual recording of identities is inefficient and error-prone, and is not recommended.

[1] CSCMP – Council of Supply Chain Management Professionals

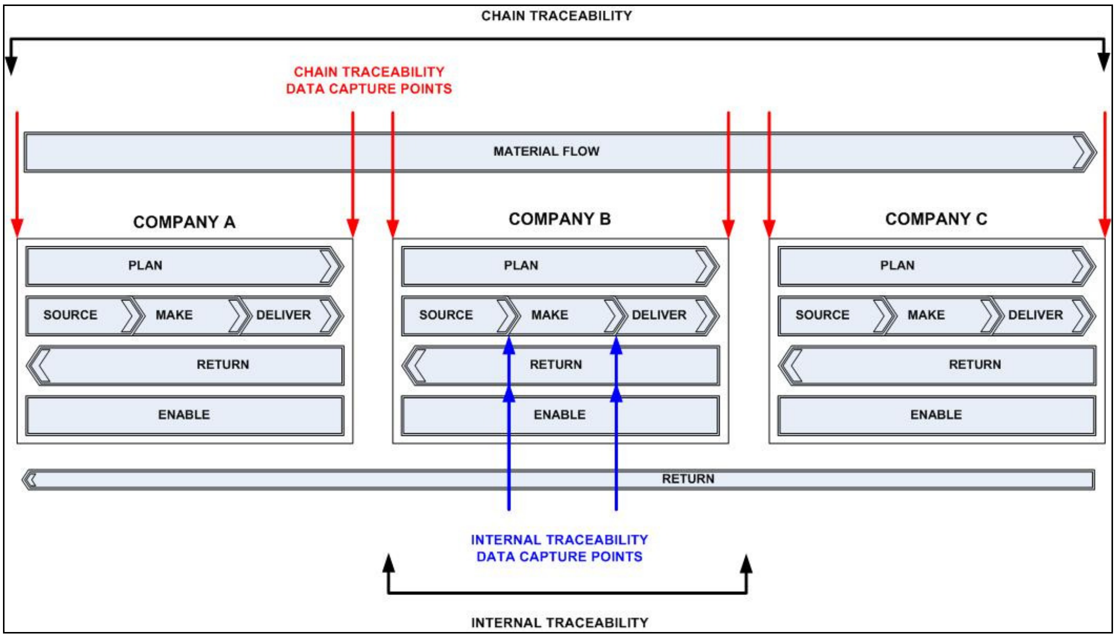


Figure 3 Principle for location of data capture points

2. Traceability surveys

Traceability surveys have been carried out for all the links in the defined chain in Figure 2.

2.1 Method

2 different methods where applied for traceability surveys during the project period. Both methods were developed during the TELOP Trace period based on practice from previous projects. The SINTEF survey matrix was made during the first months in 2003 and used for the first 2 surveys. The Fiskeriforskning survey matrix (in press) was developed and used for the rest of the investigations.

The questionnaires developed in the two methods are highly comparable in principle. The differences are more evident comparing the presentation. The SINTEF survey matrix is only used as a guiding questionnaire. The answers and results are presented in the final survey report without referring to the original matrix. The Fiskeriforskning survey matrix is used both as a guiding questionnaire and as presentation of results.

The methods are presented in Appendix A (SINTEF Guide for Chain traceability surveys) and B (Fiskeriforskning Standardised Analysis Method).

2.2 Results

A summary of major findings in each of the investigated links in the chain is presented in Table 1. The complete results from the surveys are presented in Appendix C "Results from traceability surveys TELOP Trace".

Table 1 Summary of major findings in the TELOP Trace traceability surveys.

Survey no	Link type	Major findings
1	Chemical producer	**Internal traceability** Not evaluated **Chain traceability** Dispatch: trade units were identified using lot-number. There were no logistic unit ID. Label was based on EAN128 and barcodes. **AIDC** technology was used at dispatch
2	Fish feed producer	**Internal traceability** Use of raw materials and ingredients were recorded in an electronic system. **Chain traceability** Reception: Traceability information was received in paper based trading documents. No standards for identification were in use by the suppliers. Dispatch: Identification of trade units were based on EAN 128 and bar coded. SSCC is used but not GTIN+ **AIDC** technology was used at dispatch
3	Fish farm	**Internal traceability** Well organized through software systems. Traceability links between feed and fish groups were not established. Production practice with almost no mixing of fish groups from different origin. **Chain traceability** Globally unique identifiers are not in use for received or dispatched fish groups and were not recorded at reception of feed **AIDC** technology was not used
4	Hatchery 1*	**Internal traceability** Well organized through software systems. Traceability links between feed and fish groups were not established. Production practice with almost no mixing of fish groups from different origin. **Chain traceability**

		Globally unique identifiers were not in use for received or dispatched fish groups and were not recorded at reception of feed **AIDC** technology was not used
5	Hatchery 2 **	**Internal traceability** Well organized through software systems. Traceability links between feed and fish groups were not established. Production practice with almost no mixing of fish groups from different origin. **Chain traceability** Globally unique identifiers were not in use for received or dispatched fish groups and were not recorded at reception of feed **AIDC** technology was not used
6	Processing 1	**Internal traceability** Well organized through software systems. Traceability links between production batches and input factors (packaging) were not established. **Chain traceability** Reception: Traceability information received in paper based trading documents. No standards for identification were in use. Dispatch: EAN 128 were used for identification. No use of standard labels or GTIN+. **AIDC** technology were used but not for traceability information.
7	Transport of processed salmon	**Internal traceability** Well organized through software systems **Chain traceability.** Identifiers at both reception and dispatch are based on order number and freight manifest. No links to globally unique identifiers on trade units or logistic units **AIDC** technology was not used
8	Processing 2	**Internal traceability** Organized through manual systems. Information partly re-entered in software systems (excel). Traceability links between production batches and input factors (packaging) were not established. **Chain traceability.** Reception: Globally unique identifiers were not in use on received

		raw material or other input factors. Dispatch: Non unique Lot-numbers on dispatched units linked to customer ID in software systems **AIDC** technology was not used
9	HORECA	**Internal traceability** Traceability links between production batches and input factors (packaging/ raw materials) were not established. **Chain traceability** Reception: Based on manual systems such as order number and freight manifest. No recording of batch identification. Dispatch: No use of standardized globally identifiers on trade or logistic units. **AIDC** technology was not used

* Production of fry

** Production of smolt

2.3 Summary

The survey shows that much traceability information is in place. This information is recorded and available through internal traceability software in most of the links. The HORECA link has limited internal traceability compared to the other links and their traceable information will be difficult to retrieve after repackaging or commissioning.

The traceability infrastructure found in the survey was not based on standard or globally unique identification systems. Only one link use standardized and globally unique identifiers at dispatch.

AIDC technology was used at dispatch by the chemical producer and fish feed producer; the information was automatically recorded in their ERP systems. All other links use manual recording of ID's at reception and dispatch. The live fish producer and the transport company record information into ERP systems. The HORECA companies have paper based systems for chain traceability records.

Use of electronic transfer of traceability information between the links was not detected anywhere in the chain at the time of survey.

Transport vehicle as food operators are usually not identified or linked to traceable unit ID by sender/receiver and transporter does not link orders/freightID's to global unique identifiers. Feed transporters do not record trade unit ID at dispatch to fish farms.

3. Traceability challenges

The following challenges brought to light in the surveys are central in the implementation of electronic chain traceability.

1. Unique identifiers is a basis for global chain traceability, but is not widely used. Only one of the links in the survey used such unique identifiers at time of survey.
2. Imperfect or suboptimal procedures for internal traceability give low value traceability information.
3. Extended use of semi manual documentation of chain traceability causes insecure data capture of identifications. Paper based systems means no electronic information available.
4. A general challenge in a global traceability chain is the data capture from multiple internal databases with proprietary exchange protocols.

4. Software platform

The technical platform for the TELOP project allows fast, precise, secure and easy access to relevant traceability information in the value chain for a specific product. The platform allows for connection to data from different systems as shown in Figure 4.

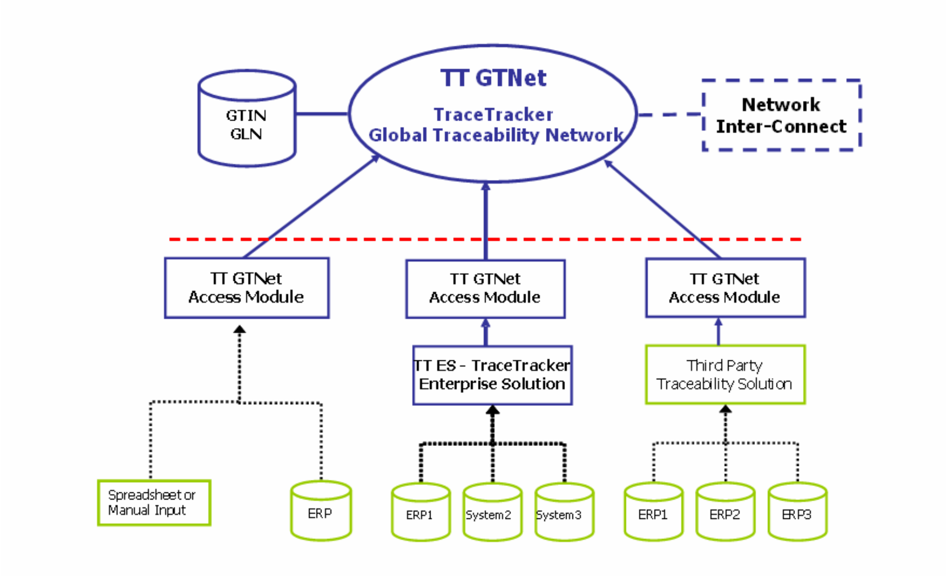


Figure 4. Solution Architecture

Internal Traceability:

One of the participating actors in the value chain already had systems for handling the complete internal traceability electronically, for the ones without such a system, a TraceTracer TTES (Enterprise System) was installed.

Data to TTES was imported from different existing platforms, being for the different companies: SAP, Superior, Maritech and Excel. Importing data from different platforms has been an important element, proving that TT systems are independent from the way in which data are captured.

TTES models the internal traceability of each of the company in question, having been configured with the traceability model suggested by the traceability survey in each one of the cases.

The TTES allows each company to visualize the internal traceability for each trade unit or batch and to view relevant properties for each trade unit or batch. As mentioned above, this information is captured by other systems (SAP, Superior, Maritech and Excel) and delivered through xml files.

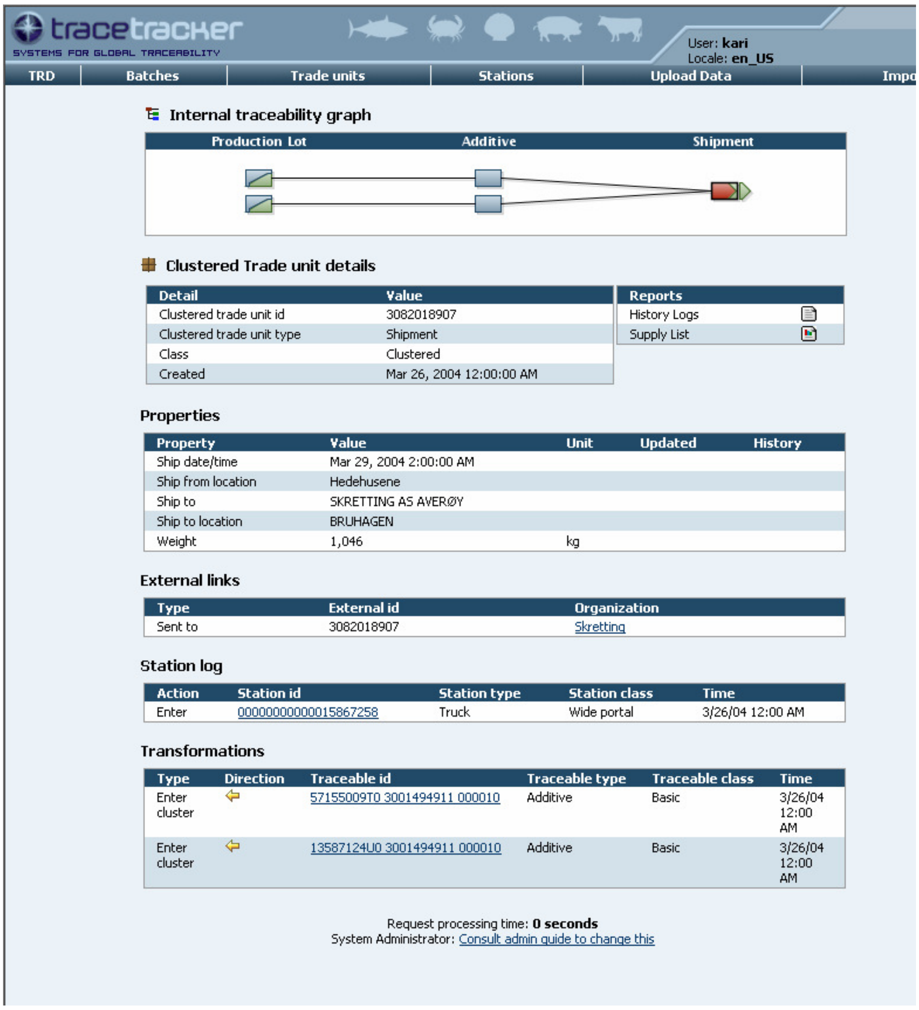


Figure 5 Examples of screenshot from TTES

Global Traceability:

Architecture:

In order to manage the challenge of exchanging traceability data between different organizational TraceTracker provided access to the GTNet for all the participating organizations. The GTNet is a net-centric service where companies access the data relevant for global traceability, ensuring the ownership of data to the company that has generated the data.

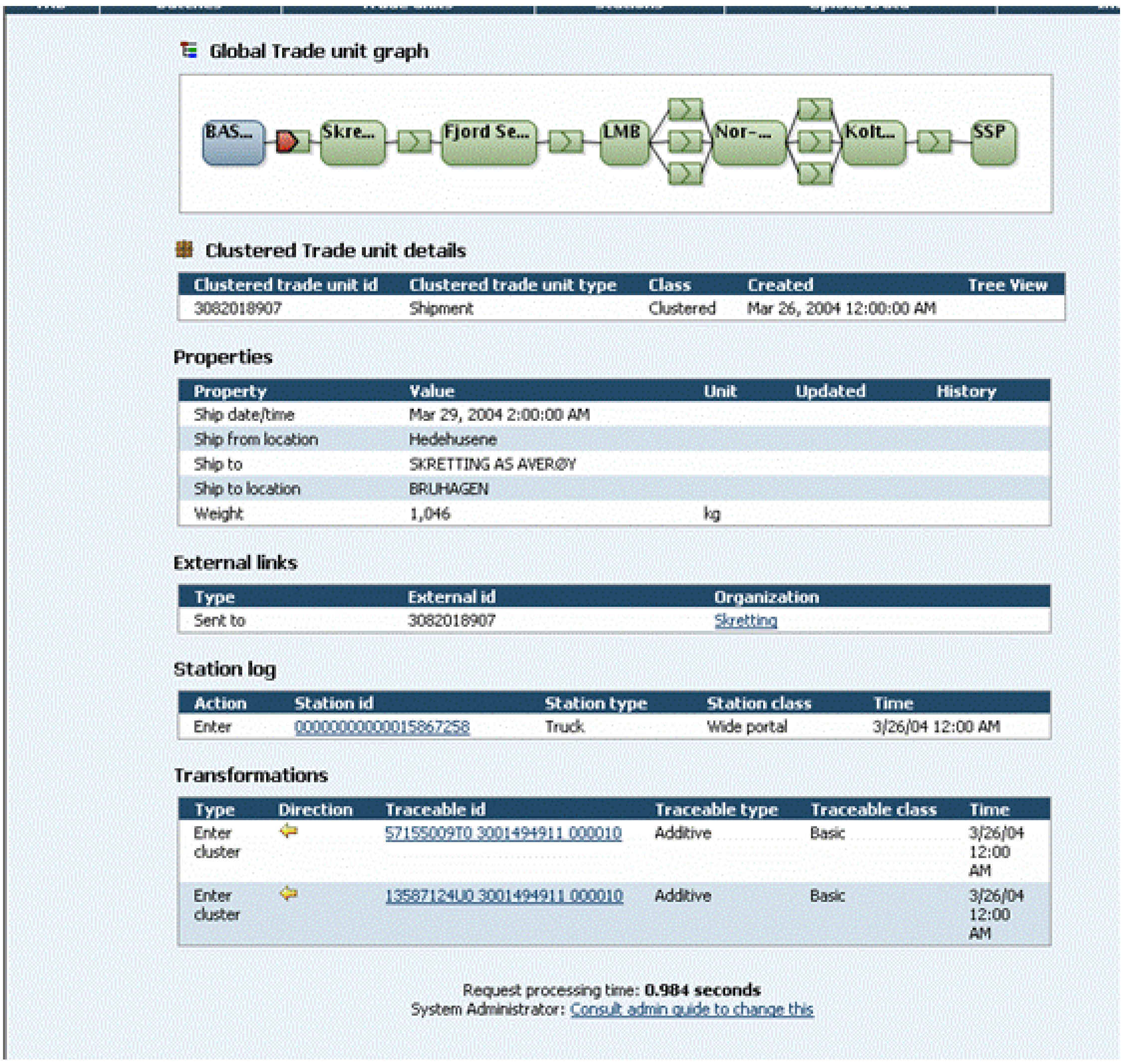


Figure 6 Example of global view for one particular trade unit

History of software development

The project was initially set up with version 2.2 of TraceTracker software. In August 2005 it was updated with version 2.4, which included many of the improvements suggested by the users. Chain participants were given full access to their systems.

TraceTracker software has continued to evolve after the Telop project and version 2.6 may now be previewed at http://demo.tracetracker.com

5. Automatic data capture of logistic information

5.1 Automatic Data Capture (ADC) systems

The basis for the use of ADC systems is a standardised system for identification. An ID system consists of two main parts:

A system for assigning an identifier based on standard data encoding rules

An information carrier which links this identifier to the traceable unit

In this context an information carrier can be a barcode label, a 2-dimentional code, an RFID tag etc. The means for unique identification will vary a lot, depending on the characteristics of the traceable units. Marking, labelling and tagging are all used as terms for attaching a physical means of identification to the unit itself, to the packaging or to the load carrier. For some product types none of these solutions are practical.

ISO/IEC 15418 establishes two organisations as responsible for maintaining data encoding rules:

- EAN/UCC Application Identifiers: Responsibility of EAN/UCC (established as GS1 in 2005)
- FACT Data Identifiers: Responsibility of ANSI MH10

The choice between the two identifier groups will normally be based on the type of industry and requirements from trading partners. Some companies need to work with both types, and will need internal mapping rules between the identifier groups.

The GS1 Application Identifiers (AI's) are widely used in the food industry, and are the focus for data encoding in this project (see appendix xx Recommendations).

The most relevant ISO standards related to ADC. The ISO 18000-6.C standard (in process) is based on the EPCGlobal (GS1) standard "EPC Gen 2 EPCglobal Class-1 Generation-2 UHF RFID Protocol for Communications at 860 MHz – 960 MHz". This is expected to be the major standard for RFID tagging of pallets and cases in supply chain applications. Detailed overview of ISO standards are presented in Appendix D (ISO Standards).

5.2 Test results summary

Production and terminal areas with fresh and/or frozen fish is a very challenging environment for RFID technology. This is due to the fact that radio waves are easily absorbed by water and these kinds of organic materials.

Standards and products have also developed rapidly over the last two years, and it has not been feasible to do large scale testing of RFID tags on pallet and case level (fresh gutted salmon on ice). Some simple tests of the well known ISO/IEC 15693 standard (13.56 MHz frequency) have been done. The tags were placed on cases of fresh salmon on ice on a pallet. They were readable only when facing towards the reader/antenna, and with very short reading distances (20-30 cm).

In parallel with the TELOP Trace project, SINTEF has worked with a major Norwegian meat producer on the use of permanent unique identifiers on reusable plastic cases. This work has included tests on 2D Datamatrix codes and RFID tags. The first RFID tests were done with early versions of 2.4 GHz technology, with read rates improving significantly in later versions of the tags. Tests are now planned with RFID tags based on the EPC Gen 2 UHF RFID Protocol.

As the RFID technology turned out to be to immature for large scale testing of tags, it was decided to focus testing on the combination of RFID and temperature loggers.

6. Time – temperature

The tests of temperature loggers were done at the Fjord Seafood production plant at Herøy in Norway. The main goal was to confirm whether the current temperature inside a case of salmon on ice could be read when a pallet was passing through a dock door at a terminal. This would enable automatic temperature checks at critical points in the distribution chain, eliminating the need for breaking pallets and opening cases.

Two different products were tested:

- Elpro Hamster R loggers, with reader/antenna from Elpro, 868 MHz
- KSW Microtec TempSens loggers, with reader/antenna from Scemtec, 13.56 MHz

Apart from the frequencies, there was one major technical distinction between the loggers: The Elpro logger used active communication, while the KSW logger was semi-passive. This means that the Elpro logger used internal battery power for communication with the reader, while the KSW logger depended on power generated from the radio waves emitted from the reader. This naturally influence the reading distances obtained.

The results were very good for the Elpro logger, the conclusion is that this type of logger can be used in real life conditions for monitoring temperatures inside a case of salmon. The detailed test plans and test results are shown in Appendix F Test of RF based temperature loggers.

Another important task in TELOP Trace has been the development of a shelflife prediction model for farmed salmon. Fiskeriforskning has been responsible for this work, and the report "Shelf life prediction model" concludes with. that maximum shelflife for salmon stored at 2, 4 and 8° is about 10,8, and 6 days respectively, and a linear development of deterioration is considered relevant for estimating correlation between the quality index and storage time. Details from the report are shown in Appendix E (Shelf life prediction of farmed salmon).

7. Handling multiple stakeholders

Project Management issues in the TraceTracker project have been complex because there are many involved companies with different motivations: commercial companies, research institutes and standardization bodies. Additionally, due to the length of the project, some of the persons representing the companies have been replaced. The TELOP-Trace project has also endeavoured in a field that is relatively new, involving new technologies and concepts.

One of the success factors has been the organization of common workshops for all participants, where results have been presented and experiences shared.

The project has contributed to relations and projects that transcend the project itself. Examples of this are commercial software installations, new traceability projects at the European level (Seafood Plus, TRACE), partnerships amongst project participants, etc.. However it has been pinpointed by the participants that the information flow in the project has not been constant and can be considerably improved in new projects. The project newsletters should be published at least bi-monthly.

8. Conclusions and Recommendations

Unique ID

One of the main challenges in implementing chain traceability and information exchange between the traceability links has been the issue of globally unique identification keys. Such keys should identify all traceable units and food business operators in the chain. The TELOP Trace-project decided to develop strict recommendations on the use of standards, coding and information exchange. The GS1 identification system was evaluated and regarded as most suitable identification standard for items/cases/pallets and food business establishments. A recommendation document for use of GS1-standards for traceability is presented in Appendix F (Use of GS1). The recommendations are based on results from surveys, input from GS1 Norway and the CEN standard TraceFish (NSF-CWA 14659-14660).

Internal traceability

To be able to take benefit out of an internal traceability system, basic internal traceability procedures has to be in place. Splitting and mixing of batches during production should be controlled and recorded. Internal return and reuse of production batches should be organised and recorded to avoid super sized batches. The survey demonstrates that the fish farming links have changed their production processes, thus improving internal traceability.

Electronic recording of traceability

To establish a global electronic traceability some of the links in the TELOP Trace chain has to reengineer their traceability recording routines. For chain traceability this includes electronic recording of all input factor ID's and origin in addition the ID's of all traceable units of produced goods and destination.

For internal traceability, transformation information and other relevant information during the production history should be recorded and linked to units produced. All these recordings should be made in electronic applications for fast access and utilization of information.

To allow more efficient data capture and data transfer, ADC equipment including software interfaces should be used. This is particularly vital for those food establishments that receive or produce high numbers of discrete products. In such production environments hasty manual entering if ID's has the potential to cause errors.

Electronic Exchange

An information standard for exchange of data between companies is beneficial for all parties in a traceability chain. Such a standard give each company the possibility to send information both directly (application-application) and indirectly (through dedicated chain traceability systems).

The CEN TraceFish standard "NSF-CWA 14659" defines the information elements and nomenclature necessary for establishing traceability. Software companies participating in the TraceFish project also defined a XML scheme for exchange of the NSF-CWA 14659 information elements. This TraceFish XML was in 2005 refined to a first draft of a generic standard (TRACE Core) in the EU-funded project TRACE. This food-generic standard will be used in all the 5 food chains in the TRACE project and should therefore be used for future implementations.

Goal achievement

The project has demonstrated how to implement EU's chain traceability requirement for food manufacturing by capturing traceability data in the whole value chain for farmed salmon. Data capture is in parts of the chain functional and effective. In other parts of the chain the data capture and exchange has been tested by using ad hoc solutions.
The data exchange is based on the TraceFish standard data elements. The technical XML TraceFish schema was not used.

Different types of RFID tags combined with temperature sensors have been evaluated and tested with promising results. The planned tests in cooperation with the TELOP data capture partner were not carried out due to non-delivery of equipment. Parallel

RFID projects in cooperation with major Norwegian meat processor have given important feedback to technology providers.

TraceTracker's system for chain traceability has been significantly improved during the project. Feedback from project partners and practical experiences has been fundamental for the development of the system.

9. Appendix

A Guide for Chain traceability surveys

B Analysis of traceability in food supply chains

C Results from traceability surveys TELOP Trace

D Shelf life prediction of farmed salmon

F Use of GS1

Use of EAN-standards for traceability in the TelopTrace project

Version 0.1

August 2006

Introduction

One of the main challenges in traceability projects has been the issue of unique identification keys on the traceable entities in the chain and information exchange between the partners. This document intends to settle doubts that have arisen about the use of standards, coding and information exchange.

Chapter 1 describes the unique identification keys and the use of the EAN-standards, giving short definitions for the essential terms and expressions and has been written by Knut Vala and Kjell Arne Myren at EAN Norway.

Chapter 2 proposes specific guidelines for labeling and logistics exchange of information for each link in a traceability chain, and has been prepared by Eskil Forås from SINTEF.

1 Relevant EAN Standards

This chapter gives short definitions for the essential terms and expressions. Then the different identification numbers in the EAN-system are described.

- the unique reference key for trade items (products) - GTIN + batch number + serial number
- the unique reference key for locations (legal entities and delivery addresses) – GLN
- the unique reference key for logistic units (e.g. pallets) – SSCC-code

Short examples are given.

The chapter also gives recommendations for barcoding of the unique reference keys on trade items and logistic units with EAN/UCC 128. The unique reference key for locations is not recommended to barcode on labels, but to be kept in the ERP-systems of the parties and transferred electronically by EDI messages.

How the unique reference keys are structured in an electronic despatch advice is also described.

At last there is given a short description of the requirements for the internal ERP-systems of the parties in the supply chain. This includes the different databases and how the different unique reference keys are linked together in the ERP-system

1.1 Definitions

AI	Abbreviation for Application Identifier
Application Identifier	The field of two or more characters at the beginning of an Element String encoded in an UCC/EAN-128 Symbol, which defines uniquely its format and meaning.
Batch/lot number	A number allocated by the manufacturer related to the production of a product.
Check digit	A digit calculated from the other digits of an GTIN, GLN or SSCC-code, used to check that the data has been correctly composed.
EAN.UCC Company Prefix	Part of the international EAN.UCC Data Structures consisting of an EAN.UCC Prefix and a Company Number, both of which are allocated by an EAN International Numbering Organisation.
EAN/UCC-128 Bar Code Symbol	A subset of the Code 128 Bar Code Symbol that is utilized exclusively for EAN.UCC defined data structures.
EAN Member Organisation	A member of EAN International that is responsible for administering the EAN.UCC System in its country (or assigned area) and for managing the correct use of the EAN.UCC System by its member companies.
ERP-system	Enterprise Resource Planning system
Extension Digit	A digit, allocated by the user, used to increase the capacity of the Serial Reference within the SSCC.
GLN	Shorthand term for the EAN.UCC Global Location Number using the EAN/UCC-13 Data Structure to identify physical, functional, or legal entities.
GTIN	Shorthand term for the EAN.UCC Global Trade Item Number. A GTIN may use the EAN/UCC-8, UCC-12, EAN/UCC-13 or EAN/UCC-14 Data Structure
GTIN+	The combination of GTIN, batch number and serial number. Used for unique identification of trade unit.
Indicator	The first digit of a EAN/UCC 14 number where 1 to 8 is used for extension of numbering capacity for fixed weight items and 9 is used exclusively for variable weight items
Location Number	See GLN.
Logistic unit	An item of any composition established for transport and/or storage that needs to be managed through the supply chain.
Serial number	A serial number allocated by the manufacturer of a trade item that is unique within a given batch or lot of trade items
Serial Shipping Container Code	See SSCC.

SSCC	The unique identification of a logistic unit using an 18-digit data structure.
Trade item	Any item (product or service) upon which there is a need to retrieve pre-defined information and that may be priced or ordered or invoiced at any point in any supply chain. In the TELOP project Trade Items are also referred to as Trade Units.

1.2 Trade items (products)

The traceability key for trade items (products) consists of the following identification numbers:

a) GTIN (Global Trade Item Number)
b) Batch/lot-number
c) Serial number

a) GTIN

GTIN (Global Trade Item Number) can be encoded by one of the following EAN numbering schemes:

- EAN/UCC 14
- EAN/UCC 13
- UCC-12
- EAN/UCC 8

For use in the TRACE project we recommend use of either EAN/UCC-14 or EAN/UCC-13. In the internal ERP-system the GTIN must be represented by a 14 digit numeric string with the following structure:

EAN/UCC-14 Data Structure

Indicator	EAN.UCC Company Prefix Article Reference	Check Digit
N_1	N_2 N_3 N_4 N_5 N_6 N_7 N_8 N_9 N_{10} N_{11} N_{12} N_{13}	N_{14}

N1 Indicator may range from 0 to 9. Indicator 9 is used for variable weight goods.
N2 – N13 Consist of Country prefix, company prefix and article reference
N14 Check digit

The GTIN is allocated by the manufacturer or brand owner of the product, but the company first needs to contact the national EAN body to be assigned a GTIN scheme.

For more information, see General EAN.UCC Specification Chapter 2.1 (www.ean.no)
http://www.ean.no/Default.asp?artID=266&show=art

e.g on EAN 13 and EAN 14
EAN 13 = **7030640000019**
EAN 14 = **17030640000016**
The number before country prefix in EAN 14 number is a indicator that can be used from 0 to 9 in trade items.

Barcoded with EAN 128
EAN 13 = (01)07030640000019
EAN 14 = (01)17030640000016

b) Batch/lot number

The batch/lot number is an internal identification number allocated by the manufacturer.

The batch/lot number is an alphanumeric string from 1 to 20 characters.

e.g
Barcoded with EAN 128
(10)1234567cc01dd4kk7890

For more information, see General EAN.UCC Specification Chapter 3.6.6 (www.ean.no)
http://www.ean.no/Default.asp?artID=266&show=art

c) Serial number

The serial number combined with the GTIN and batch/lot number of a product identify each individual item stemming out from that specific batch of the given product. The serial number field is alphanumeric and may contain from 1 to 20 characters. The serial number is allocated by the producer of the GTIN and batch. This will make the trade item keys globally unique.

e.g
Bar-coded with EAN 128
(21)01234567891011121314

For more information, see General EAN.UCC Specification Chapter 3.6.13 (www.ean.no)
http://www.ean.no/Default.asp?artID=266&show=art

1.3 Locations

Locations are identified with the GLN (Global Location Number). In the internal ERP-system the GLN must be represented by a 13 digit numeric string with the following structure:

EAN.UCC Company Prefix	Location Reference	Check Digit
N_1 N_2 N_3 N_4 N_5 N_6 N_7 N_8	N_9 N_{10} N_{11} N_{12}	N_{13}

N1 – N12 Consist of Country prefix, company prefix and location number
N13 Check digit

In the TRACE project it is recommended to identify legal entities, companies, delivery addresses etc. by GLN (Global Location Numbers).

WARNING!
In some countries GLN numbers are allocated from separate pools (e.g. Norway) – different numbers for each of them. Therefore, in order to avoid confusion and number clash, it is strongly advised to always contact a respective MO (EAN Member Organisation e.g EAN Norway) before making any decision to use a Company Prefix to create GLNs.

For more information, see General EAN.UCC Specification Chapter 2.4 (www.ean.no)
http://www.ean.no/Default.asp?artID=266&show=art

1.4 Logistic units

Logistic units (e.g. pallets, big bags) are identified by the Serial Shipping Container Code. The SSCC-code has the following structure

Extension Digit	EAN.UCC Company Prefix	Serial Reference	Check Digit
N_1	N_2 N_3 N_4 N_5 N_6 N_7 N_8 N_9 N_{10}	N_{11} N_{12} N_{13} N_{14} N_{15} N_{16} N_{17}	N_{18}

N1 Extension digit from 1-9
N2 – N17 Consist of Country prefix, company prefix and article reference
N18 Check digit

In the TRACE project it is recommended to identify logistic units by the SSCC-code.

For more information, see General EAN.UCC Specification Chapter 3.6.1 (www.ean.no)
http://www.ean.no/Default.asp?artID=266&show=art

e.g
Bar-coded with EAN 128
(00)370306400000000003

The SSCC codes are normally generated by the manufacturer or brand owner of the product.

1.5 Labels

For barcoding of products and logistic units in the TRACE project EAN/UCC 128 should be used. In the following you find the recommendations for barcoding of trading units and logistic units. It is assumed that the trading partners transfer all other information by EDI or any suitable electronic information exchange (ie. e-mails in simple cases).

a) Barcoding of trading units

The following table shows the mandatory information to be barcoded for trading units.

Information	Application Identifier (AI)	Format
GTIN	01 or 02	n2 + n14
Batch/lot number	10	n2 + an..20
Serial number	21	n2 + an..20

Example:

GTIN: 07030640000019

Batch: 123F55

Serial number: 1234567

(01)07030640000019(10)123f55(21)1234567

b) Bar-coding of logistic units

The following table shows the mandatory information to be barcoded for logistic units.

Information	Application Identifier (AI)	Format
SSCC	00	n2+n18

Example:

Sender: Skretting AS **GLN:**
Bjønkleiva 4
4000 Stavanger

Receiver: Fjord Seafood **GLN:**
Toresvei 15
Bergen

(00) 370306400000000010

In the case when trading unit and logistic unit is the same physical unit, all information is bar-coded on the same label, or on two separate labels.

For more information about EAN/UCC 128, see General EAN.UCC Specification Chapter 5.3 (www.ean.no)
http://www.ean.no/Default.asp?artID=266&show=art

1.6 EDI Messages

Each party in the supply chain of the TRACE project should ideally be able to transmit and/or receive EANCOM Despatch Advice level 3, alternatively similar XML messages). It is recommended to send one EANCOM DESADV per delivery address. The following information is mandatory

Information	Format
Despatch level	
GLN of Supplier	n13
GLN of Buyer	n13
GLN of Delivery Party if other than address of Buyer	n13
Logistic units	
SSCC	n18
Product within the logistic unit	
GTIN	n14
Batch/lot number	an..20
Serial number	an..20

1.7 The ERP-system

Each party in the supply chain of the TRACE project should have an ERP-system with information on:

- locations (legal entities, companies, delivery addresses etc.) identified with GLN and containing complete master data about each entity
- products (consumer units, trading units (cartons, fish boxes), despatch units (pallets, big bags, containers etc)
- traceability information handling
  - incoming logistic units and product batches from suppliers
  - internal production process with merges, splits and creation of production batches
  - transmitted logistic units and product batches to customers

2 Applying the Standards: Labeling and Information Exchange between partners.

Based on findings in traceability surveys and general traceability guidelines, the following chapter will present proposals for improved traceability through labeling, record keeping and electronically sent and received information. The recommendations are presented for each step in a typical traceability chain described in Figure 2

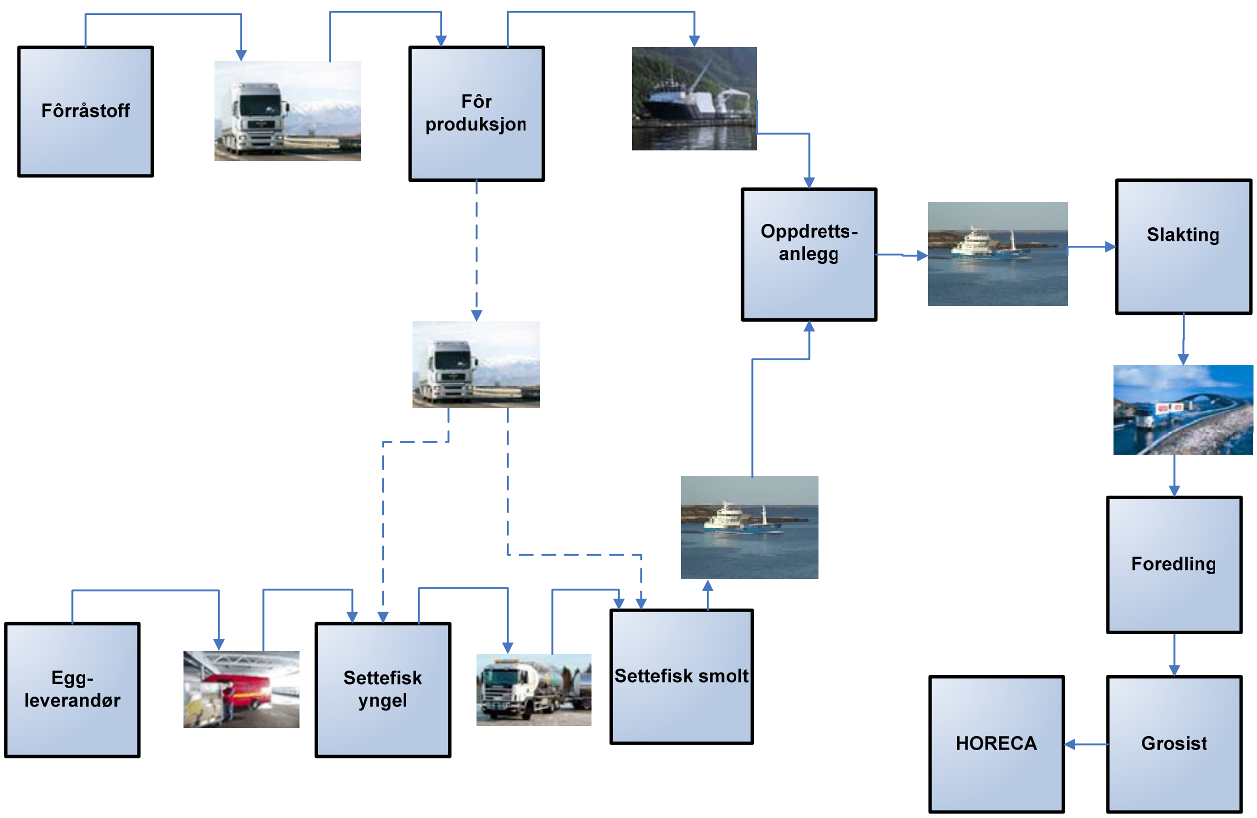


Figure 1 A typical traceability chain in the food industry

The AI numbers are shown in the tables as reference, when messages are electronic it is not common to send the AI in the message.

2.1 Raw material/additive producer

This recommendation applies to all products sold to a feed producer.

2.1.1 Identification and labelling

All trade and logistic units that are produced should be bar-coded according to Table 1.

Table 1 Barcode labelling and identification of Raw material producers trade units

Description	EAN identifications	EAN AI	Example
Logistic unit	SSCC	AI (00)	(00)370306400000000003
Trade unit	GTIN Batch number Serial number	AI (01) AI (10) AI (21)	(01)17030640000016 (10)1234567cc01dd4kk7890 (21)01234567891011121314

Receiving orders

The ID of place of delivery should be received as electronically transferred information from Feed producer.

Table 2 Electronically transferred information received from Feed producer.

Description	EAN identifications	EAN AI	Example
Feed producer establishment ID	GLN	AI (414)	(414)703064001532
Other order information			

Dispatch

The electronic data, sent to Feed producer at dispatch, should include at least an identification of producer, logistic units and connected trade units. Links between each logistic unit and the connected trade units are required.

Table 3 Electronic data transfer from Raw material producer to Feed producer.

Description	EAN identifications	EAN AI	Example
Creator of unit ID	GLN	AI (412)	(412)703064001532
Logistic unit ID	List of SSCC	AI (00)	(00)370306400000000003
Trade unit ID	List of GTIN+ GTIN Batch number Serial number	 AI (01) AI (10) AI (21)	 (01)17030640000016 (10)1234567cc01dd4kk7890 (21)01234567891011121314

2.2 Feed/nutrients producer

These recommendations apply to all production of fish feed in Feed producer.

Ordering

The identification of place of delivery should be sent as electronic data transfer from Feed producer to Raw material producer.

Table 4 Electronic data transfer from Feed producer to Raw material producer

Description	**EAN identifications**	**EAN AI**	**Example**
Feed producer establishment ID	GLN	AI (414)	(414)703064001532
Other order information			

At dispatch of the raw material order from Raw material producer/distribution terminal, Feed producer should receive electronically information that includes SSCC and the connected GTIN+, ref Table 3.

Raw material reception

At reception of raw material Feed producer should scan all logistic units received.

Table 5 Scan received logistic unit barcodes

Description	**EAN identifications**	**EAN AI**	**Example**
Logistic unit	SSCC	AI (00)	(00)370306400000000003

Production

At point of use in feed production, the ID of each trade unit of raw materials should be recorded and linked to the feed production batch.

Table 6 Scanning of trade unit barcodes of raw material at point of use.

Description	**EAN identifications**	**EAN AI**	**Example**
Trade unit	GTIN Batch number Serial number	AI (01) AI (10) AI (21)	(01)17030640000016 (10)1234567cc01dd4kk7890 (21)01234567891011121314

The information that is received electronically, scanned at reception and at point of use in the production should be stored in a way that ensures traceable links from a feed production batch back to received raw material ID’s.

If an internal raw material batch number is used, a link should be established between all GTIN+ and the corresponding raw material batch number, ref Figure 1.
.

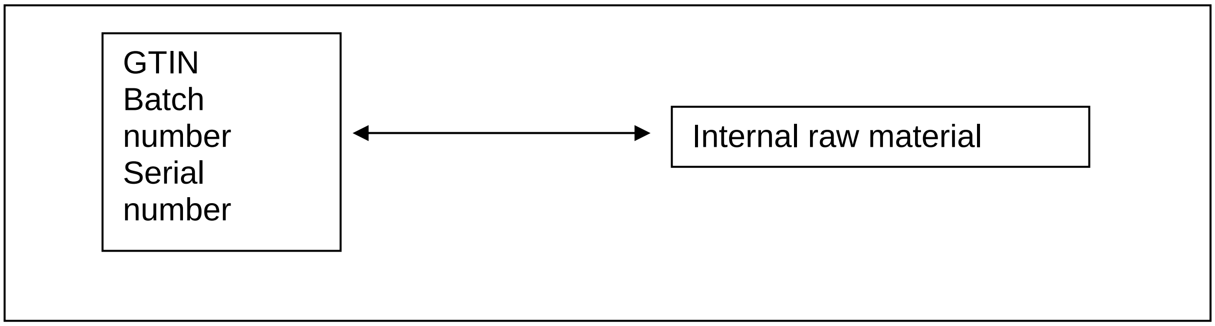


Figure 2 Link between GTIN+ and an internal raw material batch number

Identification and Labelling

At the end of the feed production the Feed producer should attach labels with barcodes on the logistic and trade units.

Table 7 Barcode labelling and identification of Feed producers trade units

Description	**EAN identifications**	**EAN AI**	**Example**
Logistic unit	SSCC	AI (00)	(00)370306400000000003
Trade unit	GTIN Batch number Serial number	AI (01) AI (10) AI (21)	(01)17030640000016 (10)1234567cc01dd4kk7890 (21)01234567891011121314

Big bags are both trade units and logistic units and should therefore be labeled with both a GTIN+ and a SSCC. Small bags are trade units on a pallet. In situations where small bags are sold individually, they are logistic units and should be additionally labeled with SSCC.

To ensure the link between trade unit/logistic unit and customer (farmser), a logistic unit ID data capture system should be in place at the feed transporters and at the farms.

Receiving orders

The ID of the place of delivery should be received as electronic transferred information from Farmer.

Table 8 Electronic transferred information received from Farmer.

Description	**EAN**	**EAN AI**	**Example**

	identifications		
Farm establishment ID	GLN	AI (414)	(414)703064001532
Other order information			

Dispatch

The electronic data sent to Farmer at dispatch should include at least an identification of producer, logistic unit and accompanying trade units.

Table 9 Electronic data transfer from Feed producer to Farmer

Description	**EAN identifications**	**EAN AI**	**Example**
Feed producer establishment ID	GLN	AI (412)	(412)703064001532
Logistic unit ID	List of SSCC	AI (00)	(00)370306400000000003
Trade unit ID	List of GTIN+ GTIN Batch number Serial number	 AI (01) AI (10) AI (21)	 (01)17030640000016 (10)1234567cc01dd4kk7890 (21)01234567891011121314

2.3 Farmer

These recommendations apply to all kind of primary production of animal or vegetable products. The generic term for all these links will be Farmer.

2.3.1 Input factors (feed/nutrients etc.)

Orders

The identification of place of delivery should be sent as electronic data transfer from Farmer to Feed producer. GLN should be used as a unique identifier for each location in Fjord Seafood. This includes all production sites for hatching, smolt production and farms.

Table 10 Electronic data transfer from Fjord to Feed producer

Description	**EAN identifications**	**EAN AI**	**Example**
Hatchery, smolt or farms establishment ID	GLN	AI (414)	(414)703064001532
Other order			

information			

At dispatch of feed from Feed producer, each farm receives electronically information from Feed producer that includes SSCC and list of connected GTIN+, ref Table 9.

Feed reception

At reception of fish feed, Farmer should scan the barcodes on all logistic units received.

Table 11 Received logistic unit ID (text and barcode)

Description	EAN identifications	EAN AI	Example
Logistic unit	SSCC	AI (00)	(00)370306400000000003

Use of feed

At point of use the GTIN+ of each fish feed trade unit should be scanned, recorded and linked to the relevant animal/animal group ref Table 13.

Table 12 Trade unit GTIN+ of feed (text and barcodes)

Description	EAN identifications	EAN AI	Example
Trade unit	GTIN Batch number Serial number	AI (01) AI (10) AI (21)	(01)17030640000016 (10)1234567cc01dd4kk7890 (21)01234567891011121314

The information that is received electronically, scanned at reception or point of use should be stored in a way that ensures traceable links from animal/animal group ID's to the attributes of the connected input factors.

2.3.2 Hatching, smolt and salmon production

These recommendations apply to all types of fish production in Farmer.

Animal/animal group identification

Animal/animal group is a trade unit. The records of identifications should be made in the production management applications.

Table 13 Identification of Fjord Seafood's trade units

Description	EAN identifications	EAN AI	Example
Trade unit	GTIN	AI (01)	(01)17030640000016

	Batch number Serial number	AI (10) AI (21)	(10)1234567000205 (21)0123

Live fish order

The ID's of the place of delivery should be sent as electronic data transfer from receiving farm to supplying farm.

Table 14 Electronic transferred ID's of place of delivery

Description	**EAN identifications**	**EAN AI**	**Example**
Receiving farm establishment ID	GLN	AI (414)	(414)703064001532
Other order information			

Live animal dispatch

At dispatch of animal, the information in Table 15 should be electronically transferred to the receiving farm.

Table 15 Electronic data transfer form Farmer to other Farms, processing plant.

Description	**EAN identifications**	**EAN AI**	**Example**
Dispatching farm establishment ID	GLN	AI (412)	(412)703064001532
Transport vehicle/vessel ID	Registration number		ST-F 123
Trade unit ID	List of GTIN+ GTIN Batch number Serial number	 AI (01) AI (10) AI (21)	 (01)17030640000016 (10)1234567000205 (21)0123

Live animal reception

At reception of fish, the electronic information in Table 15 should be verified as received. In addition, the registration number of vessel/vehicle should be recorded.

2.4 Live animal transport

These recommendations apply to transport of animals to processing. It is assumed that the live fish Transport Company never mix trade units or make new trade units during transport.

Loading

After loading is completed, the Transport Company should record the GLN of the loading, unloading locations and the dispatched trade unit's ref Table 16.

Table 16 Links between locations ID's and trade units recorded by Transport Company

Description	**EAN identifications**	**EAN AI**	**Example**
Transport vehicle/vessel ID	Registration number		ST-F 123
Dispatching Farm establishment ID	GLN	AI (414)	(414)703064001532
Receiving Farm establishment ID	GLN	AI (414)	(414)703064001532
Trade unit	GTIN Batch number Serial number	AI (01) AI (10) AI (21)	(01)17030640000016 (10)1234567cc01dd4kk7890 (21)01234567891011121314

Unloading

At unloading of animals the information in Table 17 should be electronically transferred to the receiver.

Table 17 Electronic data transfer from Transport Company to receiving site.

Description	**EAN identifications**	**EAN AI**	**Example**
Transport vehicle/vessel ID	Registration number		ST-F 123
Trade unit ID	List of GTIN+ GTIN Batch number	 AI (01) AI (10)	 (01)17030640000016 (10)1234567000205

	Serial number	AI (21)	(21)0123

2.5 Processing

Processing/transfer notice

The identification of place of delivery should be sent as electronic data transfer from Processing plant to Farmer.

Table 18 Electronic data transfer sent from Processing plant to Farmer

Description	EAN identifications	EAN AI	Example
Processor establishment ID	GLN	AI (414)	(414)703064001532
Other order information			

Receiving fish

Processing plant receives electronically information from Farmer and Transport Company that includes a list of GTIN+, ref Table 15 and Table 17.

Identification and Labelling

At the end of production the Processing plant should barcode the logistic and trade units as in Table 19.

Table 19 Identification of logistic or trade unit at end of production

Description	EAN identifications	EAN AI	Example
Logistic unit	SSCC	AI (00)	(00)370306400000000003
Trade unit ID	List of GTIN+ GTIN Batch number Serial number	 AI (01) AI (10) AI (21)	 (01)17030640000016 (10)1234567000205 (21)0123

The information that is received electronically, scanned at reception or point of use should be stored in a way that ensures traceable links from production batch ID's to the GTIN+ of the received animal/animal groups.

Receiving orders

The ID of place of delivery should be received as electronic transferred information.

Table 20 Electronic transferred information received from 2. processing.

Description	EAN identifications	EAN AI	Example
Processing establishment ID	GLN	AI (414)	(414)703064001532
Other order information			

Dispatch

The electronic data sent to 2. PROCESSING at dispatch should include at least an identification of producer, transport vehicle, logistic units and accompanying trade units.

Table 21 Electronic data transfer form Fjord Farming to 2. PROCESSING

Description	EAN identifications	EAN AI	Example
Processor establishment ID	GLN	AI (414)	(414)703064001532
Transport vehicle/vessel ID	Registration number		VF 12345
Logistic unit	SSCC	AI (00)	(00)370306400000000003
Trade unit ID	List of GTIN+ GTIN Batch number Serial number	 AI (01) AI (10) AI (21)	 (01)17030640000016 (10)1234567000205 (21)0123

2.6 Transporters

These recommendations apply to transport of salmon from 1. processing to 2 . processing.

Loading

The Transport Company receives electronically information from Farmer that includes the GLN of dispatching and receiving locations in addition to a list of SSCC's and the respective GTIN+ ref Table 21,

After loading is completed the Transport Company should record the registration number of the vehicle and the GLN of the dispatching and receiving location to the dispatched logistic unit SSCC ref Table 22.
If the Transport Company rebuilds pallets there is also a need for documentation of GLN of repacking site and all trade items (GTIN+) on each new logistic unit.

Table 22 Links between location ID's recorded by transport company

Description	EAN identifications	EAN AI	Example
Transport vehicle ID	Registration number		VF 12345
Dispatching processor establishment ID	GLN	AI (414)	(414)703064001532
Receiving processor establishment ID	GLN	AI (414)	(414)703064001532
Logistic units	SSCC	AI (00)	(00)370306400000000003

Unloading

At unloading of pallets verification of Table 21 should be made.

2.7 2. Processing

This recommendation applies to the salmon processing plants 2. Processing.

Ordering

The identification of place of delivery should be sent as electronic data transfer from 2. Processing to Farmer and Transport Company.

Table 23 Electronic data transfer from 2. Processing to Farmer,

Description	EAN identifications	EAN AI	Example
Processing establishment ID	GLN	AI (414)	(414)703064001532
Other order information			

At dispatch from 1. processing/distribution terminal, 2. Processing should receive electronic information that includes all SSCC's and a list of related GTIN+, ref Table 21.

Reception

2. Processing should scan the logistic units (SSCC) at raw material reception. In addition, the registration number of vehicle should be recorded.

Table 24 Scan received logistic units

Description	EAN identifications	EAN AI	Example
Transport vehicle ID	Registration number		VF 12345
Logistic unit	SSCC	AI (00)	(00)370306400000000003

Production

At point of use the ID of each trade unit should be recorded and linked to the relevant production batches.

Table 25 Scanning of trade units of salmon used in a production batch.

Description	EAN identifications	EAN AI	Example
Trade unit ID	List of GTIN+ GTIN	AI (01)	(01)17030640000016

	Batch number Serial number	AI (10) AI (21)	(10)1234567000205 (21)0123

The information that is received electronically, scanned at reception or point of use should be stored in a way that ensures traceable links from animal/animal group ID's to the attributes of the connected input factors.
If internal raw material batch number is used then there should be established a link between all GTIN+ and the corresponding raw material number ref Figure 1.

Identification and Labelling

At the end of production 2. Processing should barcode the logistic and trade units.

Table 26 Barcode labelling and identification of 2. Processing trade units

Description	**EAN identifications**	**EAN AI**	**Example**
Logistic unit	SSCC	AI (00)	(00)370306400000000003
Trade unit ID	List of GTIN+ GTIN Batch number Serial number	 AI (01) AI (10) AI (21)	 (01)17030640000016 (10)1234567000205 (21)0123

Pallets are logistic units. Boxes are trade units
If boxes are sold individually, they should be identified and labeled with a SSCC.
To ensure the link between trade unit/logistic unit and customer, an ID data capture system should be in place at transporters and at 2. Processing.

Dispatch

The electronic data sent to customer at dispatch should include at least an identification of producer, logistic unit and accompanying trade units.

Table 27 Electronic data transfer form 2. Processing to customer.

Description	**EAN identifications**	**EAN AI**	**Example**
Processor establishment ID	GLN	AI (412)	(412)703064001532
Logistic unit ID	List of SSCC	AI (00)	(00)370306400000000003
Trade unit ID	List of GTIN+ GTIN Batch number Serial number	 AI (01) AI (10) AI (21)	 (01)17030640000016 (10)1234567cc01dd4kk7890 (21)01234567891011121314

2.8 Wholessaler

This recommendation applies to the special wholesaler.

Ordering

The identification of place of delivery should be sent as electronic data transfer from wholesaler to the Supplier.

Table 28 Electronic data transfer from wholesaler to supplier,

Description	EAN identifications	EAN AI	Example
Supplier establishment ID	GLN	AI (414)	(414)703064001532
Other order information			

At dispatch from supplier/distribution terminal, wholesaler should receive electronic information that includes all SSCC's and a list of related GTIN+, ref Table 30

Table 29 Electronic data transfer form supplier to wholesaler

Description	EAN identifications	EAN AI	Example
Supplier establishment ID	GLN	AI (414)	(414)703064001532
Transport vehicle ID	Registration number		VF 12345
Logistic unit	SSCC	AI (00)	(00)370306400000000003
Trade unit ID	List of GTIN+ GTIN Batch number Serial number	 AI (01) AI (10) AI (21)	 (01)17030640000016 (10)1234567000205 (21)0123

Reception

Wholesaler should scan the logistic units (SSCC) at raw material reception. In addition, the registration number of transport vehicle should be recorded.

Table 30 Scan received logistic units

Description	EAN identifications	EAN AI	Example
Logistic unit	SSCC	AI (00)	(00)370306400000000003

Transport vehicle ID	Registration number		VF 12345

Production

At point of use the ID of each raw material trade unit should be recorded and linked to the relevant production batches.

Table 31 Scanning of trade units of salmon used in a production batch.

Description	**EAN identifications**	**EAN AI**	**Example**
Trade unit ID	List of GTIN+ GTIN Batch number Serial number	 AI (01) AI (10) AI (21)	 (01)17030640000016 (10)1234567000205 (21)0123

The information that is received electronically, scanned at reception or point of use should be stored in a way that ensures traceable links from animal/animal group ID's to the attributes of the connected input factors.

If internal raw material batch number is used then there should be established a link between all GTIN+ and the corresponding raw material number ref Figure 1.

Identification and Labelling

At the end of production wholesaler should barcode the logistic and trade units.

Table 32 Barcode labelling and identification of wholesaler trade units

Description	**EAN identifications**	**EAN AI**	**Example**
Logistic unit	SSCC	AI (00)	(00)370306400000000003
Trade unit ID	List of GTIN+ GTIN Batch number Serial number	 AI (01) AI (10) AI (21)	 (01)17030640000016 (10)1234567000205 (21)0123

Pallets are logistic units. Boxes are trade units
If boxes are sold individually, they should be identified and labeled with a SSCC.
To ensure the link between trade unit/logistic unit and customer, an ID data capture system should be in place at transporters and at wholesaler.

Dispatch

The electronic data sent to customer at dispatch should include at least an identification of producer, logistic unit and accompanying trade units.

Table 33 Electronic data transfer form wholesaler to customer.

Description	EAN identifications	EAN AI	Example
Processor establishment ID	GLN	AI (412)	(412)703064001532
Logistic unit ID	List of SSCC	AI (00)	(00)370306400000000003
Trade unit ID	List of GTIN+ GTIN Batch number Serial number	 AI (01) AI (10) AI (21)	 (01)17030640000016 (10)1234567cc01dd4kk7890 (21)01234567891011121314

2.9 HORECA

This recommendation applies to the HORECA links

Ordering

The identification of place of delivery should be sent as electronic data transfer from HORECA to the Supplier.

Table 34 Electronic data transfer from HORECA to supplier,

Description	EAN identifications	EAN AI	Example
Supplier establishment ID	GLN	AI (414)	(414)703064001532
Other order information			

At dispatch from supplier/distribution terminal, HORECA should receive electronic information that includes all SSCC's and a list of related GTIN+, ref Table 30

Table 35 Electronic data transfer form supplier to HORECA

Description	EAN identifications	EAN AI	Example
Supplier establishment ID	GLN	AI (414)	(414)703064001532
Transport vehicle ID	Registration number		VF 12345
Logistic unit	SSCC	AI (00)	(00)370306400000000003
Trade unit ID	List of GTIN+ GTIN Batch number Serial number	 AI (01) AI (10) AI (21)	 (01)17030640000016 (10)1234567000205 (21)0123

Reception

HORECA should scan the logistic units (SSCC) at raw material reception. In addition, the registration number of transport vehicle should be recorded.

Table 36 Scan received logistic units

Description	EAN identifications	EAN AI	Example

Logistic unit	SSCC	AI (00)	(00)370306400000000003
Transport vehicle ID	Registration number		VF 12345

Production

At point of use the ID of each raw material trade unit should be recorded and linked to the relevant production batches.

Table 37 Scanning of trade units of salmon used in a production batch.

Description	**EAN identifications**	**EAN AI**	**Example**
Trade unit ID	List of GTIN+ GTIN Batch number Serial number	 AI (01) AI (10) AI (21)	 (01)17030640000016 (10)1234567000205 (21)0123

The information that is received electronically, scanned at reception or point of use should be stored in a way that ensures traceable links from animal/animal group ID's to the attributes of the connected input factors.

If internal raw material batch number is used then there should be established a link between all GTIN+ and the corresponding raw material number ref Figure 1.