



White Paper from GS1 Germany

Use GS1 Standards to Organize Cash Handling and ATM Processes

Strategies for Implementation in Banking and Retail

GS1 Standards include globally used Auto-ID and EDI communication systems to operate the cash supply chain more secure and efficient. Central Banks in Europe adopt the GS1 Standards to organize their cash handling processes with connected banks, retailers and CiTs. In future the commercial players will profit by implementing the standards to their cash cycle end to end. GS1 Standards will be state-of-the-art and key element supporting automation technologies and IT systems.

The White Paper will outline an overview about:

- When do you need the GS1 Standards?
- How do you profit in organizing your cash supply chain?
- What are the implementation steps for systems and technologies?
- What are the future GS1 activities to keep you updated?

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Management Summary

Banks and retailers are challenged to provide adequate cash supply to different cash points where currency is required to service their customers. Competitive market advantages are connected to economics of scale within cash supply chain depending on automation and standardization. Advanced processes need organizational capabilities; especially in data analytics and data exchange to ensure interoperability between involved parties in cash cycle.

Standardized cash handling solutions like CashEDI in Germany were only the beginning; the end-to-end adaptation of the GS1 Standards enables further process optimization within the entire cash cycle for involved cash handlers. GS1 Germany works on identified and prioritized tasks to support their customers in banking and retail as well as services and technology providers in development and implementation of future target scenarios to benefit from

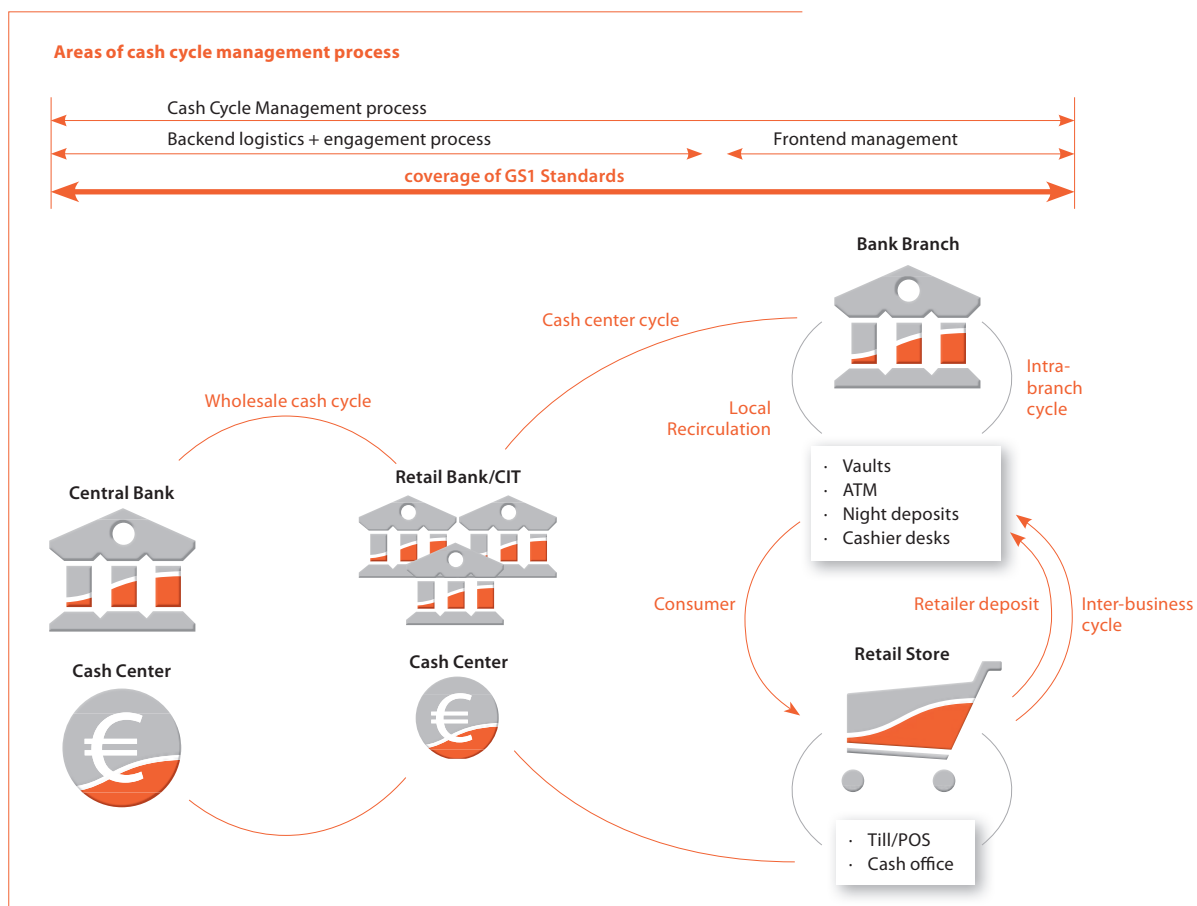
- Cash optimization with inventory forecasting and capacity planning in logistics
- Tracking & tracing of orders and shipment incl. pre-warning and control functions
- Recirculation with banknote fitness sorting and adequate reporting
- Operational risk management for business contingency and multi-vendor management
- New ATM technologies for advanced cash cycle management
- Initiated projects for further standardization in RFID and ATM cassettes
- Initiated implementation projects for the designed concepts in pilot installations

GS1 Germany enters into discussions and agreements with all respective parties on national and international basis. The GS1 Standards for Auto-ID and EDI communication integrated in Information and Communication Technology is major key to next level of cost management and technical-proofed sustainability.

Market framework to optimize cash supply chain

New, increasing pressure in the financial services market present unique challenges for organizations operating and managing the cash supply chain. The requirements are changing dynamically; management attention focus on significant cost reduction, far more secured and risk managed processes, improved integration of cash handling automation at POS/cashier and in cash centers in connection with a managed cash cycle just-in-time.

Financial Services and retail sector is lagging behind in optimizing cash supply chain.



The banking and retail frontend determines the requirement for cash and maintenance services just-in-time respecting flexible inflow and outflow of cash at each cash point. The backend process relates to a dynamic cash cycle management according to defined service levels for transport and cash center logistics. The optimization level within whole cash cycle process can be measured by device availability, e.g. ATMs, recyclers, cashier desks at frontend and involved logistics costs and cash in circulation to reflect inventories at branches and involved cash centers.

Automation in frontend and backend requires a process consideration end-to-end to assure cash availability at POS/ATM and managed costs of cash within entire branch network.

Relevance for involved parties in the cash cycle

GS1 Standards supports the E2E cash cycle and leads to benefits for professional cash handlers, such as

- National Central Banks (NCB), mints and printing plants
- Commercial Banks
- Retailers and commercial enterprises with store network
- Service providers, e.g. CiT, operator of Cash Center, 4PL and IT center
- Technology suppliers, e.g. ATM manufacture, IT/software provider

GS1 Standards to manage cash logistics

Unique identification system supported by GS1 data keys

The cash supply chain considers cash delivery and cash deposit processes. Depending on technical feasibility and security policies cash recirculation could be possible on different levels- at POS, at branch or in cash centers.

GS1 Standards in Auto-ID and EDI communication support efficient cash order and cash deposit process for Retail, Banking and CITs. First implementation with countrywide coverage for all cash handlers introduced the Deutsche Bundesbank for Germany.

| GS1 Identification keys | Relevance for cash cycle |
|--|---|
| <p>GLN (Global Location Number)</p> <p>13-digit number that identifies uniquely any physical or legal location or party involved in a given transaction. The GLN is constructed from a GS1 company prefix assigned to a company, an item reference designated by the company and a check digit.</p> <p>GS1 Company Prefix → Item reference</p> <p>N₁ N₂ N₃ N₄ N₅ N₆ N₇ N₈ N₉ N₁₀ N₁₁ N₁₂ N₁₃</p> | <p>The GLN identifies professional cash handlers in the cash cycle. For unique identification of cash points in the client's branch network the applied GLN will be used, so each client is able to cluster cash points, working places and processing systems, ATMs, branches and regions.</p> |
| <p>GTIN (Global Trade Item Number)</p> <p>GTIN based on GLN basic number. Identification number of 13 digits for products and services.</p> | <p>GTINs are assigned by the ECB or NCB to banknotes and coins in different status, such as denomination, series, condition or packaging detail. GTINs may also be used for the identification of special services.</p> |
| <p>SSCC (Serial Shipping Container Code)</p> <p>18-digit number that uniquely identifies a logistic unit and provides an efficient way to facilitate automated dispatch, delivery and good-in processes. The SSCC is used to manage storage and shipping of logistic units. To accelerate the identification processes the SSCC is typically expressed in a bar code GS1-128 or can be also encoded into a RFID tag as per the EPC format (Electronic Product Code).</p> | <p>In order to clearly identify cash units they are given a SSCC. This number enables to track the cash on the way to the scheduled destination (NCB branch, ancillary cash centres of the CIT company or bank etc.). The SSCC correlates to today's functionality of seal ID.</p> |

Communication via standardized message types (EDI)

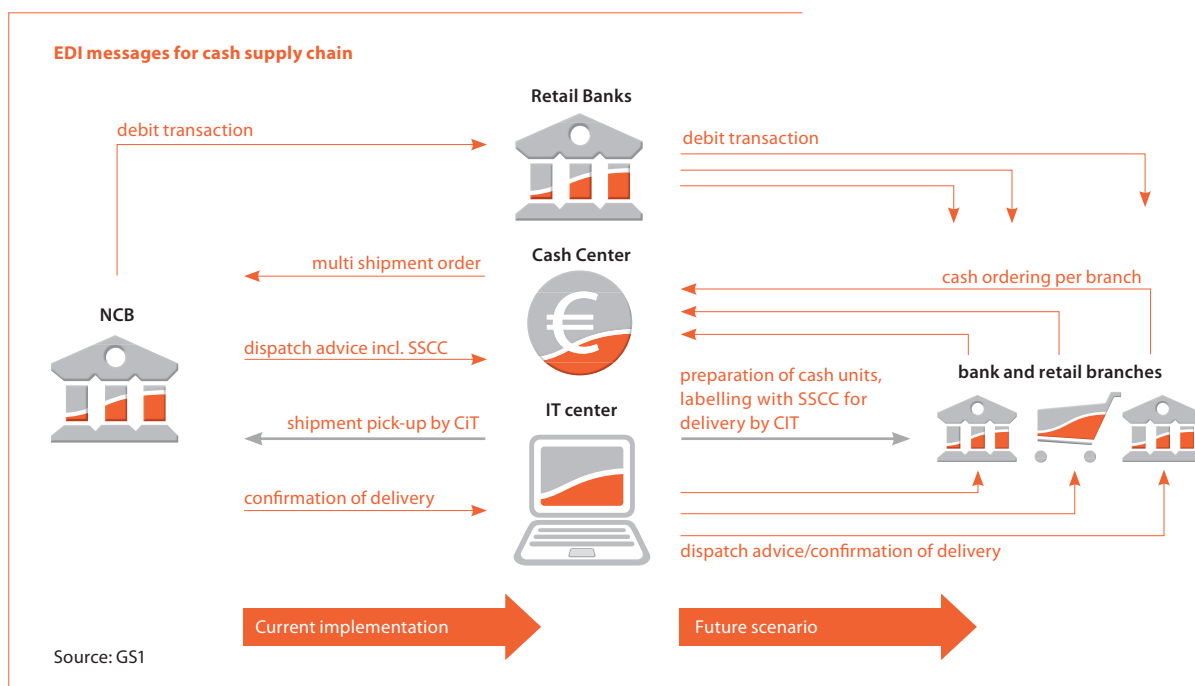
The ordering and depositing process of cash can be eased substantially by the GS1 based message transfer. In Germany the following processes are in place with regards to the communication with Deutsche Bundesbank:

Electronic Cash Ordering:

The cash handler – authorized by GLN – transfers an electronic Cash Order to the NCB. After preparation of the withdrawal the NCB can send a Notification of Delivery that contains information about the prepared cash units according to the order. With the Confirmation of Delivery the NCB informs its customer about the handover/liability transfer of the cash to the assigned CiT.

Electronic Notification for Cash Deposit:

The Customer has to announce its cash deposit electronically to the NCB prior to the physical delivery with a Notification about Deposit. Having taken the respective shipment into consideration by handover from CiT, NCB answers this message with a Confirmation of Receipt. After processing and reconciliation of the deposit NCB informs the customer about the counting results and differences in comparison to said-to-contain amount (Final Receipt)



Because of the messages' neutral design the data flow is not limited to central bank operations. Adaptations for commercial cash cycle including professional cash handlers are ongoing.

Based on the above mentioned GS1 identification keys, GS1 provides EDI communication standard message types based on both GS1 eCom Standards EANCOM® and GS1 XML. The main messages used for cash transactions based on GS1 XML are:

- "Multi Shipment Order" for cash orders
- "Dispatch Advice" for notification of delivery, confirmation of delivery and notification of deposit
- "Receiving Advice" for confirmation of receipt, arrival notice and final receipt
- "Application Receipt Acknowledgement" for service message

Clearly identification of orders, shipments over locations, transport units is basis for EDI communication. Use of designed GS1 Standards allows interoperability between involved cash handlers in the regional cash cycles.

Auto-ID via barcodes and RFID

Standards in data structuring and EDI communication assure a fast and safe internal and external data flow with tracking and tracing ability for each order information and each transported/processed shipment. With Barcodes (format GS1-128) and EPC/RFID the identification and communication can be automated, e.g. for

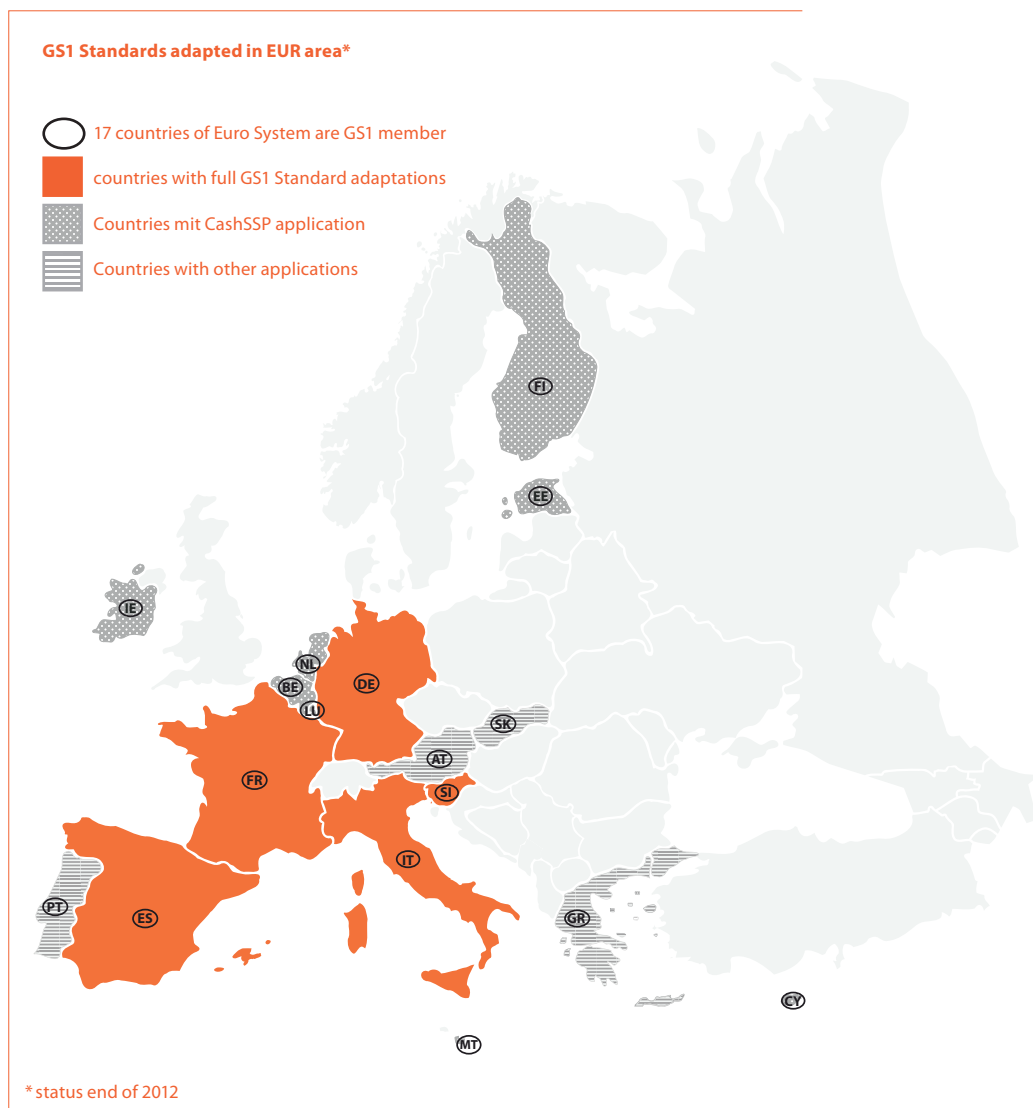
- Reduction of handling errors
- Speed up of handling process to operate shipments and orders
- Increase of security through End to End tracking of safebags/cassettes/containers; by using EPC/RFID also with bulk notification at transfer point, e.g. gates in cash centers or branches
- Tracing of cash orders/deposits incl. retracing in case of cash differences
- Authentication and access control at POS, ATMs or cash vaults via unique codes in correlation with service orders
- Automated deposit processing within cash centers
- Automated inventory of vaults and gap analysis via RFID

Secure authentication and continuous tracking & tracing based on barcode or RFID media.

Implementation strategies

National Central Bank guidelines as compelling event

Deutsche Bundesbank has introduced the system CashEDI to organize a standardized EDI for cash orders and deposits with correlated cash handles. This high security solution was developed in conjunction with GS1 Germany using GS1 eCom Standards and making full use of the GS1 Identification Keys (GTIN, GLN, GS1-128 barcode). Other National Central Banks follow in adaptation of the GS1 Standards with comparable solutions, in essence France, Italy, Slovenia and Spain.



In order to optimize the information flow for cash business in Europe, the Euro-system has been striving for a solution to establish an electronic data exchange for cash services (DECS). Within DECS the European Central Bank officially acknowledged the GS1 Standards as communication system. In the Euro system the ECB provides a common list of harmonized cash articles based on GTIN.¹ Furthermore the GS1 Standards were accepted in the Eurosystem as standard for cross-border bulk transfers between printing plants and NCBs². So other IT systems, e.g. CashSSP have to support in addition to their own numbering system the GS1 Standards of GLN and GTIN.

GS1 organizations support worldwide National Central Banks in development and implementation of standards. European Central Bank acknowledged the GS1 Standards in 2012.

GS1 Standards are currently analyzed to support cash handlers in order to fulfill further ECB guidelines like the Banknote Recycling Framework (Appendix IV). Automated reporting of master data about infrastructure ID and monitoring of operational cash cycles data is feasible based on GLN/GTIN/GRAI numbers per cash handler.

Cash cycle management supported by GS1 Standards

Automated and audit-proofed communication and data exchange between the cash handlers in the supply chain is major key to reach next level of cash cycle management. Standards are set and mandatory for interoperability between businesses and systems.

Target of GS1: Support in process optimization for banking and retail cash cycle up to inter-business operations by GS1 Standards. Benefits are identified.

To optimize overall cash cycle management the approved methods and standards of GS1 in the wholesale cash cycle with NCB shall be transferred to the branch and cash center network cycle of banks, retailers and CITs. The adaptation affects core processes and procedures.

Cash inventory management for cash points/ATMs/vaults/branches

Proper master data structuring for each cash point within the cash cycle network is essential for identification as location with GLN or asset with GRAI. IT systems will use these basic numbers as identifier for EDI in case of cash monitoring, forecasting and order processing, so a single cash order is connected to a target ID by GLN and to respective shipment by SSCC.

Service order processing with resource and transport route planning

Transparent tracking & tracing for all involved parties is feasible, if per shipment the related order and involved parties at hand-over points can be identified uniquely. So each tracking point, e.g. teller station, truck/messenger, cash center workstation should be identified. Resource and route planning systems should use the unique numbers to complete the orders by performer, transport unit and seal-ID. So control and pre-warning systems can use this information in case of outstanding orders.

Cash order processing for recirculation

For recirculation banknote fitness sorting and adequate reporting per processing system are mandatory. Deposits should be identified by seal ID (SSCC), processed by authorized machine type (GTIN of manufacturer/GLN of processing location) and can be reconciled to owner and settled account (GLN). With this standard identification the retracing methods can be build up in case of cash differences.

¹ Download GTIN of ECB: www.cb-usergroup.org

² www.cb-usergroup.org

Logistics engagement process with contract management, SLA reporting and invoicing

Operational risk management includes business contingency and change management procedures. Proper master data and the EDI capability of customer and service suppliers enable to react faster and efficient in case of emergency. Takeover of new service points or a capacity switch between services organizations can be executed flexible and reliable. Multi-vendor management strategies and operational target to uptime of systems and service delivery can be assured.

Asset management for branches (ATM, POS tellers, IT equipment), in cash centers (banknote and coin processing systems, IT equipment) truck and transport units (ATM cassettes and cash boxes)

Lifecycle management solutions monitor assets by type (GTIN) and asset owner (GRAI). So service orders to maintain assets have a clear reference. In case of transport units adopted pooling systems share transport assets between different parties in the region and save overall investments.

Future technologies respect these criteria and endorse the market implementation. Early adaptors will profit from outlined cost and security advantages. Target is to establish regional communities enabled for collaborative working principals to improve the way the supply chain interacts.

Integration of GS1 Standards into cash technologies and IT systems enables market implementation for early adaptors.

Implementation phases and steps

Implementation of new logistics processes needs planning. Based on structured project management the defined optimization potential will be realized.

Five Step approach of GS1 Germany: Guidance for process optimization in cash logistics.

Following project steps are recommended:

Step 1: Review of current processes and network

To know the internal and external processes are the beginning. The analysis should consider as well procedures and policies (P&P's), technology and capacities, process and media interfaces for cash optimization, ordering, shipment handover, cash processing and storage for each involved party. Mirroring of as-is analysis against internal and external contracts shows first process gaps. The following questions should be answered:

- Where get cash points/branches their cash and who do the dispatching in each case? (central vs. de-central ordering/contracting per branch or region)
- Who are involved in the cash delivery or cash deposit process; e.g. CiT, Cash Center, NCB location, ATM service supplier?
- What kind of IT system supports the processes?

Step 2: Build up knowledge about GS1 Standards

GS1 Standards open various application fields, e.g. product coding, transport and logistics, security, inventory and reporting. It makes sense to sensitive all involved departments in the development and implementation process. GS1 Germany initiates seminars for future know how transfer to bank, retailer and CiT clients.

Step 3: Define targets

Specification of project targets helps organizations to achieve management goals. According to balanced scorecard financial, customer and process potentials shall be defined and prioritized.

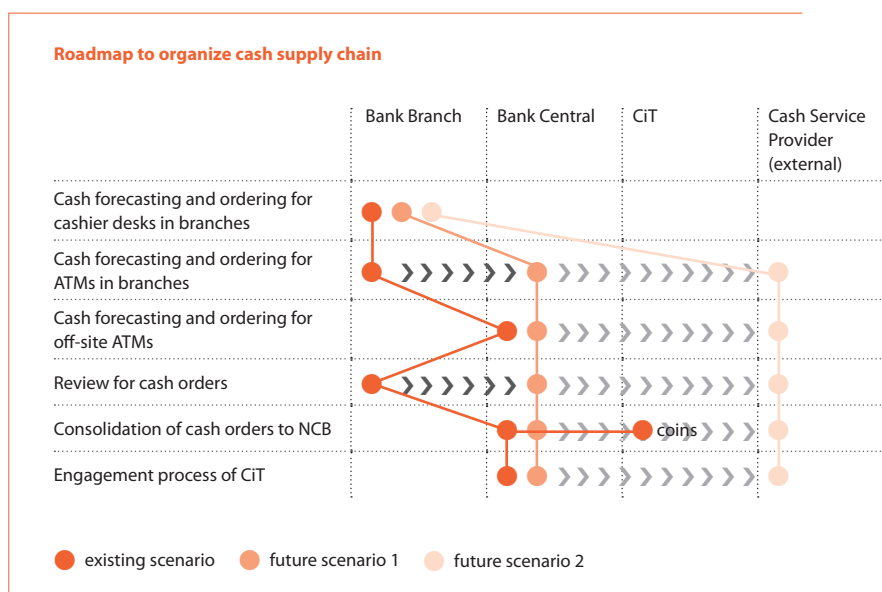
Step 4: Design concept

Developing a target scenario for core processes starts with a concept design. The future scenarios should respect collaborative working principals for all specified cash cycles i.e.:

- CashEDI based on GS1Standards for wholesale business with NCBs and in following to
- Recirculation at frontend/within branches and backend logistics processes using EDI communication for cash orders/deposits
- Operational risk management for logistics engagement process

GS1 Consult brings different cash handlers in projects together to implement best practice processes

The concept design shows the benefits and gaps between the existing and future scenarios, so the project activities can be outlined in the implementation plan. The roadmap shall respect priority for most beneficial processes at the beginning.



Step 5: Implementation of target scenario

First stage of implementation is the agreement about new processes with all involved parties and the preparation/development of necessary technology, IT infrastructure and service operations. Second stage shall be a test environment for the future scenario followed by a pilot for one branch/store and region.

Initiatives of GS1 Germany

Implementation of best practice solutions needs education, training and consulting. GS1 Germany leads industry working groups with key players and associations in case of standardization in cash handling. In addition we organize the congress for cash logistics in Germany³ and establish specified seminars and trainings for banks, retailers and CiTs. To support planning and implementation of new processes and procedures in reference projects GS1 Germany manages consulting projects for technology providers and operational users.

GS1 Germany supports their customers with training seminars and leads industry working groups to develop and adapt standardization for cash handling processes.

| GS1 program for cash logistics | | |
|---|--|--|
| GS1 Standards | Knowledge transfer | Implementation services |
| Germany <ul style="list-style-type: none"> Committee in cash logistics (CashCOM) | GS1 Seminars/Academy <ul style="list-style-type: none"> Training for Banks Training for Retailers Training for service providers/CiT | GS1 Consult <ul style="list-style-type: none"> Process optimization Feasibility studies Reference projects |
| EU/International <ul style="list-style-type: none"> Central Bank User Group In dialogue with ATMIA/Euricpa/ other key stakeholders | GS1 Event <ul style="list-style-type: none"> Bargeldlogistikkongress (DE) | Customer-Service-Desk <ul style="list-style-type: none"> Service hotline for products and consulting (GS1 complete) |

GS1 Germany will support the industry to enhance planned adaptations of GS1 Standards to the entire cash cycle. In this propose an expert committee (CashCOM) was established in 2012 to agree about processes and EDI standards, development of service catalogues and technical standards. Aim is to agree on common standards within the cash industry of banks, retailers, CiTs and technology providers.

For Germany GS1 initiated the committee "CashCOM" and offers the "Cash Manager seminars". Best practice show cases for cash logistics will be implemented in the "Cash Value Chain" in Cologne.

For knowhow transfer to our clients GS1 Germany offers a seminar concept starting in 2013. Step by step the results of the CashCOM will be introduced in the "Cash Manager seminars":

| Training seminars for banks, retailers and CiT providers | | |
|--|---|--|
| Basic courses | Advanced courses | Advances courses supported by technology providers |
| <ul style="list-style-type: none"> GS1 Standards in cash handling processes Optimize cash logistics with EDI | <ul style="list-style-type: none"> Operational risk management Optimize cash center processing and transport, maintenance | <ul style="list-style-type: none"> Automation of branches/ or stores Cash Cycle Management end to end EPC/RFID implementation |

³ Bargeldlogistikkongress für Deutschland; www.bargeldlogistikkongress.de

For training and seminar purpose GS1 Germany implements show case processes in their Knowledge Center in Cologne. The designed “cash value chain” leads to Auto-ID and EDI communication in conjunction with state-of-the-art technology along the cash supply chain including retail POS, back office consolidation and ATM management in banks.

GS1 Germany leads the cash activities of GS1 in Europe and acts as a central point of entry for the business requirements of Central Bank-GS1-User Group which consists of NCBs that use or intend to use GS1 Standards for their cash supply chain.

In addition GS1 Germany is in dialogue through ATMIA Europe with the stakeholders for the European cash cycle markets. This concerns an end-to end interoperability for logistical processes and involved technology along the cash supply chain.

GS1 Germany is involved in European standardization projects of Central Bank User Group and in dialogue with key stakeholders through ATMIA Europe.

Additional elements

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Downloads

- [White Paper in PDF.File](#)
- [General Overview on Cash Handling Processes](#)
- [Movie Clip: Cash Logistics supported by GS1 Standards](#)
- [GTIN list of ECB](#)

Glossary

| | |
|----------------|---|
| BMEcat | Catalogue interchange format. |
| EANCOM® | Standard for electronic data interchange which is derived from the official UN/EDIFACT standard and is used worldwide in the consumer goods industry. |
| eCl@ss | An international standard for classifying and describing products and services. |
| EDI | Electronic Data Interchange. |
| EDIFACT | Electronic Data Interchange for Administration, Commerce and Transport; international, cross-industry standard for exchanging electronic business data. |
| EPC | Electronic Product Code in RFID technology; builds on the EAN standard; also common: EPC/RFID. |
| GIAI | Global Individual Asset Identifier; EAN object or container number. |
| GLN | Global Location Number (previously ILN). A numbering structure which is valid worldwide for unambiguous identification of physical, functional or legal units in companies and/or parts of companies, for example warehouse or goods receipt ramps. |
| GPC | Global Product Classification, an international classification system. |
| GRAI | Global Returnable Asset Identifier; identifier for reusable transport packaging. |
| GS1 DataMatrix | Two-dimensional code from the GS1 portfolio which encodes a great deal of information in a very small space. |
| GS1-128 | International standard for encoding basic and additional logistical information (e.g. batch numbers, best before date, GTIN of the retail unit) |
| GTIN | Global Trade Item Number (international designation of the EAN). ID number which is unique worldwide which identifies an article or retail unit in its specific version. |
| ILN | International Location Number (= GLN, Global Location Number). |
| NVE | Number of the shipping container (English = SSCC, Serial Shipping Container Code). An internationally agreed, uniform 18-character number for shipping containers which is unique worldwide. |
| POS | Point of Sale. |
| PRICAT | Price/Sales Catalogue, EANCOM® message for transferring article master data. |
| RFID | Radio Frequency Identification. Technology for automatic recording of products and objects by means of radio. |
| XML | Extensible Markup Language; markup language for presenting hierarchically structured data in the form of text files. |

About GS1 Germany

GS1 Germany supports companies from all sectors in the adoption and practical implementation of modern communication and process standards, in order to improve the efficiency of their business processes. Within Germany, the company is responsible for the maintenance and continued development of the GS1 article identification system GTIN for globally unique identification, which in turn serves as the basis for bar codes. Moreover, GS1 Germany supports the application of new technologies for fully automatic object identification (EPC/RFID) and offers customer-orientated solutions (ECR – Efficient Consumer Response).

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