NARM Digital Think Tank White Paper:
Digital Supply Chain & Operations – A Music Industry Initiative
Version 1.0

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Introduction

The world of the supply chain for music has become incredibly complicated. With more than 50 years of experience, the physical product world has evolved to a science the ordering, billing, shipping, receiving, returning, and display of goods to the customer. Although the systems do play very well with each other, the customer experience still comes down to the staff that positions and sorts a product at the retail location. When something in the chain goes awry, a human at the store is there to offer on-site assistance to the customer.

On the digital side of the supply chain, human intervention is nearly impossible in the blizzard of information. Audio, video, ringtones, ringbacks, virtual goods, games, apps, and a myriad of bundles delivered to multiple screens means that any hiccups in the delivery and display of this content means a frustrated or lost customer, and lost sales.

And the marketplace is not going to get less complicated or less crowded. New products and services will only increase the need for better information flow between partners. Success will not only require vast libraries of available titles, but also a steady flow of information to keep the customers engaged. Manual processes to handle the perpetual refresh of these products will not be able to handle the volume, which adds another dimension to the challenges in the supply chain and information infrastructure.

An additional area of concern is the reporting and analysis of sales. Content creators and retailers need to be able to react quickly to the on-demand market and render marketing and programming decisions based on what's happening today, not what happened 30 or 60 days in the past.

All of these issues directly relate to the bottom line of everyone involved in the business of music – the ability to rapidly innovate and deploy new customer services and increase the convenience for those who purchase, rather than pirate, music.

Through a series of discussions, meetings and surveys, The NARM Digital Think Tank has collected input, intelligence and information from its members. That feedback has guided the creation of this initial document. It is intended to provide a baseline understanding of the core issues in music delivery and information for the industry, and to be a starting point for action within the NARM membership. This document will be updated as new information becomes available.

About the NARM Digital Think Tank

The NARM Digital Think Tank is a special task force within NARM dedicated to resolving issues related to the enterprise-level digital music business. The Digital Think Tank will function as a plenary, where executive delegates assign specialists within their companies to focus on specific issues.

Background Information

In order to properly identify challenges and potential solutions to the issues discussed in the Introduction, it's important to view them in the context of the history and current landscape of digital information exchange, both in the music business and in other industries.

EDI
The information backbone of the physical supply chain is automated Electronic Data Interchange (EDI), a digital system that replaced manual purchase orders, bills of lading and invoicing between partners.

Beginning in the 1960s in the logistics industry, the U.S. Transportation Data Coordinating Committee (TDCC) created a basic set of standard EDI messages, which were then superseded with the forming of the American National Standards Institute (ANSI) and the introduction of the X12 standard in 1979. The X12 remains in use today for communication within the United States and is currently used on the physical distribution side of the music business.

XML
Extensible Markup Language (XML) is the current open standard for electronically encoding documents. It offers key benefits over EDI messaging in that it is easily validated and data-mapping is simplified. While EDI defines only the core construction rules for messages, XML allows multiple sets of semantics in a self-contained document while allowing easy deployment of APIs.

Current formats that use XML include content syndication mechanisms (RSS and Atom) and popular API frameworks (REST and SOAP).

Examples of Standardization From Other Industries

Finance
SWIFT (The Society for Worldwide Interbank Financial Telecommunication) is a Belgian financial standards cooperative with 8,000+ banking, securities and corporate customers. Its primary function is to relay secure messages between multiple financial institutions. Transactions covered by SWIFT include payments, trade services, derivatives, loans and deposits, foreign exchange, and corporate proxy services. InterAct is the SWIFT XML messaging service supporting the synchronous or asynchronous exchange of messages between partners.

SWIFT functions both as a standards and as an implementation body for the financial sector. In addition to supplying hardware and software, the entity defines standards and resolves solutions to issues of mutual interest.

Insurance
ACORD (Association for Cooperative Operations Research and Development) is a global, nonprofit standards development organization serving the insurance industry. Its mission is "to facilitate the development of open consensus data standards and standard forms. ACORD members include hundreds of insurance and reinsurance companies, agents and brokers, software providers, and industry associations worldwide. ACORD works with these organizations towards a goal of improved data communication across diverse platforms through implementation of standards." To increase productivity for its members, it maintains both XML and paper form standards in two major groups: Life, Annuity & Health; and Property & Casualty/Surety.

ACORD does not maintain only XML standards; it is inclusive of forms and its own EDI standards that focus on data exchange between P&C insurers, surety organizations, their agents, and other trading partners.

ACORD has developed a flexible and iterative approach to standards. After beginning with the basic transactions, elements are added according to the priorities of participating entities. This ensures light, fast and effective development to meet the needs of the market.

This standard includes both XML and paper form standards to increase productivity for the industry.

Travel
The Open Travel Alliance (OTA) is a non-profit organization that consists of airlines, hotels, rental car agencies, and other providers. In its goal to create and encourage implementation of open standards, the OTA created XML specifications that serve as a common mechanism for promoting the exchange of information throughout the travel industry. Airlines have been putting the OTA specs to use for bookings, simplified distribution, and links with car-rental companies and travel agencies. However, various articles, including a 2005 *Information Week* piece on the OTA, reported that adoption and implementation of the standards proved to be an issue. Airlines found that some partners weren't ready to abandon existing proprietary XML schemas.

In order to persuade and facilitate greater and easier adoption of the standards, the OTA is now creating an Open Travel Data Dictionary that aligns the varying specifications and resolves conflicting definitions among the proprietary schema. It also includes a dynamic package messaging system that would expand reservation mechanisms outside of the air and hotel components.

Music Industry Standardization

DDEX
The music industry has developed its own standard XML message suite around the two major informational currencies of the business – new release information and sales reporting under the Digital Data Exchange (DDEX).

The principal standards created by the DDEX Plenary are ERN (Electronic Release Notification) and DSR (Digital Sales Report). Both are available in simple formats.

According to the organization's website, "DDEX standards are used by media companies, including major record companies such as Sony Music and Warner Music Group; major rights societies such as ASCAP, BMI, the Harry Fox Agency, PRS for Music, and SACEM; and digital and mobile service providers such as Apple iTunes, Muzak, Orange, SFR, Spotify, Real Networks, Telefónica Servicios de Música, and others."

NARM is an official liaison organization to DDEX. NARM's role with DDEX is primarily in the area of evangelizing the importance of standards in the market. While the NARM Digital Think Tank provides feedback regarding challenges that the constituency is experiencing with standardization, NARM also encourages members to directly participate in DDEX in order to address any specific requirements with the spec itself.

It is increasingly the view of many DDEX members that there may be a role for service providers to offer, for example, centralized messaging services. There also may be a role for service integrators that provide software packages that can be bolted onto a company's own systems. As described in a later section, NARM will assist in this role of bringing middleware players to the table.

Rightscom, the entity that provides operations for DDEX, has other technologies, including semantic technologies such as COA (Contextual Ontalogyx Architecture), that may address other operational issues surrounding the fuzzy logic of associating bundled content, genre taxonomy and repertoire issues.

NARM
The National Association of Recording Merchandisers has played a historical role in physical operations and standards for the music business via its Operations Committee.

The November 1, 1986, issue of *Billboard Magazine* details some of the efforts made by the NARM Operations Committee:

> "The task is far from complete, but the record labels and key accounts are making strides toward accomplishing a computerized pipeline that would link suppliers with their customers. ... Attendees here for the Oct. 9-10 (1986) NARM Operations Conference reported several key accomplishments by both manufacturers and retailers that will help the music industry realize such a system. ... All parties concerned could expect concrete savings and other benefits from successful implementation of ordering through telecommunications."

The NARM Operations Committee was created to resolve outstanding supply chain issues in the music business and continues to be the forum whereby money-saving, pro-competitive efficiencies are identified, developed and implemented.

Issues defined and resolved by the Committee have included:

- EDI adoption and use of NARM standardized order forms;
- Implementation and best-practices for placement of UPCs on product types;
- Delivery of graphics;
- Downloadable sound samples;
- ASN/ UCC 128 implementation (carton & pallet level);
- Standard carton counts;
- Implementation of EDI X12 standard; and
- Creation of the NARM Online Distributor Database.

The current NARM Distributor Database was created in the mid 1990s to alleviate the manpower costs of transposing catalog information into spreadsheets. To accomplish this, NARM created its own data standard – the space-delimited UPC200 (indicating the number of characters in the record). Over the years, this standard was expanded to the current UPC425 standard in order to accommodate more data. It provides for a perpetually refreshed and consistent source of physical product catalog and new release information.

The NARM UPC425 has also been integrated into large-chain EDI systems. All of the major and leading independent suppliers upload their catalog and new release information to the NARM Distributor Database at least daily, which retailers then download and use to validate (cross-check) and populate their own internal purchasing databases, among other things.

Standardization Challenges

To jumpstart the DTT Digital Supply Chain & Operations Work Group, NARM polled its digital retail and supplier members in late 2009 with a survey containing questions about DDEX implementation and their top five issues surrounding digital supply chain issues. Respondents to the NARM survey included five suppliers and 13 key digital retail partners. Below are key findings of that survey.

DDEX Feedback Summary

- 71% of respondents to the survey have not yet implemented DDEX ERN or DSR standards of any kind.

- Of those who have implemented or are testing DDEX standards, 60% have implemented or are testing full ERN standard, while DSR and DSR (simple) are evenly divided with 20% each.

- On the part of those who have not implemented DDEX, just under half (46%) cited lack of industry consensus around standards as the primary barrier to adoption. A third of these (33.3%) indicated they do not have resources available to upgrade their systems.

- Of the non-implementing respondents, only 13% describe lack of ROI as a major barrier to implementation of the standard.

- According to one respondent, the technical barrier to entry for smaller suppliers is quite high, and such companies would seek assistance to make it feasible.

Additional Digital Challenges

Aside from issues related to DDEX-specific implementation issues, there are many other challenges related to digital operations. Based on the NARM member poll, below are general consensus items that the NARM DTT Digital Supply Chain & Operations Work Group is using as the basis for prioritization.

Takedowns, Rights Changes and Revocation

The industry needs more proactive identifications, warnings and alternatives around revocations. Also related is the continued process of changing UPCs as catalogs change hands, taking media down only for redelivery after an album is reissued (as though it were a physical CD that had to be restocked). This practice is unnecessary and causes consumer confusion. The current consensus is that a universal, unchanging ID space, independent of UPC and current rights holders, would be of benefit.

Content Association

A unique identifier provided by labels for the purpose of bundling tracks across product types may also prove beneficial. Content bundle creation is complicated by inconsistencies from various partners that use ISRC and UPC, and compounded further both by data quality and rights revocation issues mentioned elsewhere in this document.

Data Quality and Taxonomy Issues
Because ingestion of content is not a standardized process, members devote considerable labor to quality assurance by trying to match up content into the correct taxonomies. This is important to the quality of the consumer experience for many reasons. For example, artists often have multiple label representation and when a discography of an artist is presented to a consumer, retailers would like to be able to aggregate content for that artist into one presentation, regardless of which label the content came from.

Missing or corrupted critical information can also prevent final publishing to a digital storefront; e.g., missing album cover artwork or incomplete global-offer information that can result in assets not being delivered for all intended territories, leading to lost revenue for all parties involved. In addition, incomplete information may not be caught as a failure by automated systems, requiring human intervention to discover and resolve the issue, thereby increasing operational costs.

Inconsistencies in naming conventions in multiple types or iterations of variable products derived from the same master create issues as well (e.g., Artist A with Artist B; Artist A feat. Artist B, etc.). A vast array of genre/sub-genre definitions (including important localized genre nuances) and lack of a normalized, marketplace approach can result in content being misrepresented and/or misfiled, leading to further consequences as noted prior. Also, establishment of underlying data standards and taxonomy would enhance reporting data integrity, speed report processing and payments, and aid reconciliation and audit processes, all of which can be very challenging.

Delivery
While the consensus seems to be that options for FTP content delivery should remain in place, further standardization around the delivery mechanisms using a web service model approach would allow for automated acknowledgement and rejection of deliveries; querying by both sending and receiving parties for status; and other benefits. In the case of music video, loaders must be custom-built by the retailer.

Choreography methods vary label by label, and this introduces complexities, increases overhead, and impedes speedy supply chain integration and on-boarding (and creates ongoing risk if label-specific, customized ingestion logic is not properly coded). Likewise, elements of custom choreography can lead to costly supply chain latencies and disruptions. Driving toward an efficient standard would improve performance.

There is also a lack of a consistent method to report and track content delivery issues; a variety of ad hoc methods are employed. Just as DDEX defined a standardized financial reporting formats, a similar effort on defining content bug reports may prove useful to improve response time to content-defect issues cited in the previous section.

Marketing Information

Suppliers should provide easy-to-integrate feeds of artist biography, current marketing or ancillary release information that all labels have at their disposal. At the very least, suppliers should being able to deliver links within supplied metadata to appropriate feeds from internal and external sources.

Publishing

International Standard Musical Work Code (ISWC) is a unique identifier for musical works. The NARM DTT Digital Operations & Supply Chain Work Group will discuss how use of this or other unique identifiers may develop systems to streamline synchronization of royalty processes for multiple formats (such as ringtones, ringbacks and apps).

Future Technologies To Consider

Visual Search/Augmented Reality Applications

Visual search (and QR codes) are already a reality with mobile applications. The technology allows a customer to search for products using mobile photo images. Applications already in the market from Google, Amazon and Tineye allow shopping for products or quick look-up of Wikipedia information simply by snapping a photo. NARM is looking to identify normalization strategies that suppliers or retailers may investigate to ensure customers are immediately connected to sources of legitimate commerce and information.

Augmented reality allows the user to use the viewfinder or screen on their device to place contextually related information from the cloud. The DTT Digital Operations & Supply Chain Work Group may consider the implications of these types of applications on information architecture innovation for supplier members.

Device and Service Interoperability

As music experiences move further into the cloud, the DTT Digital Operations & Supply Chain Work Group will examine various platforms for exchange of information – and the underlying operational implications.

The Semantic Web

As the music industry builds new digital media products that aggregate and filter artist information, it will need to use and adapt the evolving methods of intelligently sorting and parsing data. For example, a photograph of an artist is no longer just an image; it's also a hub for information. What year was the photo taken? What venue? What members of the group are in that photo and where are their personal biographies? What instruments are they playing? What brand of shoes is the singer wearing? The list of information linked to media is endless, but the need to decide on how to supply, embed or track this information is critical to creating ongoing value for music fans in music-based digital products.

Conclusions and Recommendations

There is a general consensus around the idea of standards, but not around implementing them. While quick fixes may be required to address certain hot-button issues, if all the companies involved take a wait-and-see approach, a standards-based ecosystem for innovation cannot be achieved.

NARM understands that the day-to-day practicalities of resource allocation and lack of industry consensus has slowed adoption of standards. However, historical context given in the previous section shows that standards do have the demonstrable effect of creating a pro-competitive, more consumer friendly marketplace for all. We've seen this movie before – with EDI, the NARM Distributor Database and other physical solutions – and NARM has been an instrument of that change.

NARM also understands that partners with existing legacy systems are reluctant to update their protocols when "everything works" today. However, NARM also understands that rapidly evolving product types will place a heavier burden on those systems and build an information bubble that may very well burst if all parties do not come to the table.

It is the function of the NARM DTT Digital Supply Chain & Operations Work Group to bring the parties together and create the architecture necessary to support a more efficient supply chain. The Work Group will develop recommendations on how these goals can be realized through various industry or commercial initiatives.

The DTT Supply Chain & Operations Work Group is also participating in a next-generation retooling of the current NARM Database. This new, backwards-compatible Integrated Product Database will aggregate all formats of physical, digital and mobile products from all major and leading independent suppliers and provide easy methods to syndicate and use that content for members.

As we look longer term to the overall industry adoption of various standards, the DTT Digital Supply Chain & Operations Work Group will evaluate product presentations of potential solutions providers, if any, or examine the feasibility of NARM developing its own systems to fill a market void, and socializing the cost over the participating members. Using the principles of SOA (Service Oriented Architecture), NARM can introduce, facilitate or create solutions that will assist members in harmonizing legacy systems with these new standards.

Finally, NARM recommends that each member company take an active role in determining the priorities and action items of the DTT Digital Supply Chain & Operations Work Group by assigning a decision-making executive to the Work Group. Thereafter, the group will meet on a scheduled basis and communicate as needed through a web-based project management tool to meet assigned milestones.