

## The Coexistence Imperative

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### COEXISTENCE VS. MIGRATION

Discussion of ISO 20022 generally revolves around the revolution it has created. Common protocols for common business models! Finally, a transition to a single protocol. No more translation, no more “lost in translation,” no more costs of translation. A world with one language, a shared language that lowers barriers to communications in electronic payments, equities, derivatives, insurance and re-insurance, perhaps even healthcare, energy trading and used-automobile pricing. Straight-through processing becomes the norm rather than something for which we struggle; shared business models with shared XML on-the-wire formats unify our world, and we become a big happy family.

Unfortunately, it’s an oasis in the desert, a chimera, a ghost. It’s an example of what I call the “N+1” problem, going back to my days integrating intelligent expert systems with high-performance numerical analysis engines. Back in those ancient days—in the last century even!—the IEEE conceived of a standard format (IEEE P754 was its lyrical name) for sharing floating-point numbers. As I was spending at least half of my time dealing with the complex task of translating floating-point numbers between systems, I was ecstatic. We would go from a world with N different formats, to a world with a single format! The world would be my oyster.

Perhaps it was an oyster, but one with no pearl. The reality I lived in was that IEEE P754 joined the world of multiple formats, rather than replacing that world. Instead of N different floating-point numbers being replaced with a single format, we ended up with N+1 formats, with the new P754 joining the fray. My world got just a little bit more complex. Worse, it came to me in a rush that even if somehow P754 had replaced all previous formats, eventually another format would have come along and we’d be back at square one—or perhaps square two, as we’d again have multiple formats, with all of the costs and maintenance overhead that entailed.

Coexistence and migration have been debated to death in our community, without a final decision. The reality is that



“perfect” migration (to a single standard) will never happen, and if it did, it wouldn’t last. There will always be need for coexistence, and it’s better if we plan for it rather than hope for it.

### THERE’S GOOD NEWS

The good news, however, is that ISO 20022 did plan for coexistence. In fact, it acknowledges it using terms other than coexistence such as Model Level Compliance, Interoperability and Reverse Engineering. From the first, the agreement to

- Specify business models in a higher-level abstract language (OMG’s Unified Modeling Language®, or UML®);
- Put in place a clear process for capturing shared business models in that language;
- Automatically generate on-the-wire formats from those high level agreed models; and,
- Allow multiple such generations (multiple on-the-wire formats)

20022 is a remarkably powerful structure. By capturing the actual business models in a high-level language, ISO 20022 enables business analysts to in effect design interoperability messages. This is an amazing feat, one not equaled by any of the predecessors or contemporaries of ISO 20022. Further, the high-level specification of ISO 20022 allows all sorts of other artifacts of interoperability to be generated:

- Through a process called Model-Driven Architecture®, UML models can be used to completely and automatically generate program code and code skeletons to simplify the process of dealing with UML-defined messages (such as ISO 20022 messages);
- Likewise, automated test-case generation (for regression testing and acceptance testing) can be, and is routinely done by UML users worldwide in the fields of software, systems engineering, process control, business analysts and other fields;

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- Systems can be fully simulated from UML models, resulting in visual acceptance of those models by the business analysts and executives whose businesses require them. This is a remarkably powerful way to ensure that a business model actually carries out the transactions expected by those that designed the model; and,
- Automated translations can be generated from shared business models, when there are in fact multiple syntaxes for that business model.

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This last point is the focus of my thesis. It's not really a very technical point; in fact, we can use the simple metaphor of human (spoken) languages. All human languages express essentially the same ideas; whether I say blue in English, or *azul* in Spanish, or *aoi* in Japanese, I am expressing the same concept. How do we deal with translation between human languages? Why, with dictionaries of course. There are of course matters of grammar too—that's the main complication in human language translation, especially when various grammatical concepts don't translate at all (for example, the *subjunctive* case of Latin tongues is essentially gone from English; and the critical particles of Japanese never existed in Western languages). The other major complication for translators is of course the inherent ambiguity in human languages; while it makes translation delightful for those of us interested in linguistics, it causes no end of havoc in international affairs.

### COMPUTER LANGUAGES ARE DIFFERENT

Fortunately, computer languages—whether programming languages, database description languages, or on-the-wire interoperability protocols like ISO 20022's XML syntax—are not ambiguous. We require them to have quite precise meanings, especially when there is money riding on the result. So once we remove the overhead of ambiguity from language, we are left with the problems of grammar and vocabulary (dictionary). In the Information & Communications Technology (ICT) world, we call these syntax and semantics. And we know how to deal with them; since the dawn of the Information Age we have been doing so, with technology variously called interpreters and compilers.

That's not even the best news—the best news is that it's the *business models* that are standardized in ISO 20022, not the protocols. That means we already have shared semantics, a shared dictionary of ideas that we can use to translate from one language (on-the-wire protocol) to another. All we need is a way to specify

- Translations between concepts (through that shared dictionary); and
- The structure of messages that need to be translated (the syntax).

It turns out those are not particularly difficult to provide, once we have a shared set of business models, leading us to that shared dictionary.

### ENTER MDMI

The Unified Modeling Language that underlies ISO 20022 was the result of a hard-fought consensus in the ICT industry to share a single language for specifying

concepts and the relationships between those concepts. This effort was carried out in the late 1990's at the Object Management Group™ (OMG™), an international, not-for-profit consortium of more than 400 ICT end-users and vendors, universities, research institutions and government agencies that wanted to drive down the costs of ICT by providing simpler, more comprehensive integration and interoperability between systems. The choice of UML by ISO for the ISO 20022 standard is one of the many thousands of vindications that UML has enjoyed over the years.

By itself, however, UML would not provide the coexistence that we crave for financial services messaging (and which I hope I have convinced you we need). As above, we must have a shared dictionary and a shared way to specify message syntax, or grammar. In the first decade of this century, OMG focused on extending the concepts of UML to a standard called the Model-Driven Message Interoperability™ (MDMI™) standard, to solve this problem. The MDMI open standard defines “maps” that enable transaction data transformations. These maps are computer readable and unambiguously define and preserve the business payload (content) of any financial message regardless of its original protocol. MDMI has these four technical pillars:

1. Separation of data structures from business meaning – this assures repeatable maps.
2. Appropriate granularity for semantic interoperability – this assures reliable business information.
3. Hardened technology using Model Driven Architecture (MDA) – this assures openness.
4. Reuse and support of existing financial services and technical standards – this assures lowest adoption costs.

### BEYOND COEXISTENCE: INTEROPERABILITY

So far we've focused on the coexistence problem that has received so much attention. As much as MDMI is a solution to the coexistence problem, it potentially has a larger benefit in what I call the

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interoperability problem. ISO 20022 has revolutionized the way the banking community shares models, enabling them to achieve the benefits of interoperability. Just as ISO 20022 can generate message formats from its shared models for the financial industry, other industries are doing the same with their message formats from their shared models. Examples of other communities following in these footsteps are healthcare, insurance, rail transportation, and many others.

To achieve automated and high quality end-to-end business transactions, just like in coexistence, information in one message format will need to be moved into a different message format.

This is the interoperability problem, moving information from one shared model with a specific message format into a different shared model with a different message format. The adoption of MDMI will provide not only the ability to address the coexistence problem, it will also provide a platform for enabling interoperability across multiple domains that can lead to faster, more agile, higher quality, end-to-end business transactions.

#### MDMI CAN DELIVER THE FOLLOWING BENEFITS:

- Assure legacy and new message coexistence and interoperability.
- Support for computer readable maps published by existing financial standards organizations.
- Increase quality and reliability by using repeatable, testable, measurable maps.
- Eliminate the time consuming, expensive and error prone approach of bilateral mapping by allowing the owner of a message to only understand their message format and the industry standard dictionary.
- Eliminate the retooling requirement for organizations that are using internal message formats.
- Assist migration to ISO 20022 using existing messaging standards and formats.
- Enable creation of reusable data dictionaries.
- Simplify and hasten introduction of new financial products while dramatically reducing costs of modifying existing messages.
- Leverage global OMG IT vendor community who provide UML compliant tools.
- Create a way of interconnecting networks of financial value exchange, mixing protocols or expediently and safely creating new message formats.

#### NEXT STEPS

The OMG MDMI Standard has been approved by OMG. OMG even initiated an OMG MDMI Consortium to vet the standard to ensure it meets the diverse needs and requirements for the ISO 20022 community. OMG has been working with members of the ISO TC68's WG4 in order to encourage the inclusion of language in the ISO 20022 standard similar to what is present for OMG's UML specification; that the OMG MDMI Standard is a solution for standards bodies, central banks, banks, and vendors to address the issue of message co-existence by whatever term you wish to use: message coexistence, message interoperability, Model Level Compliance, or reverse engineering.

MDMI significantly contributes to the reduction of risks and costs originating from the use of multiple message protocols. In addition, it offers a solid platform of real semantic interoperability, which will be the basis for further innovative improvements. And finally, as with all standards, the value of MDMI increases dramatically as more and more MDMI maps are developed and used. OMG is confident that MDMI can deliver this great value to the banking community.