

Whitepaper: The Future of Risk, Capital and Margin Reporting

INTRODUCTION

Management of risk in derivatives markets has changed beyond recognition over the past decade, with the introduction of mandatory central clearing, margin requirements for non-cleared trades, trade reporting and revised capital requirements, including mandatory new standard capital models for market and counterparty risk. The effect has been to make the derivatives markets safer and more transparent.

Regulators increasingly now require firms to report portfolio risk data at a detailed level, including in the context of benchmarking their capital models. While the aim of risk data reporting is to enhance transparency and standardization across the industry, there is significant scope for inconsistency in the reporting, analysis and interpretation of this data.

At this critical stage in the implementation of the Basel III capital requirements, regulators and market participants have an opportunity to work together to promote common standards and a uniform approach to risk data reporting and processing. If regulators globally used an established industry standard within their requirements, they would have a greater degree of confidence in the consistency and accuracy of the risk data being collected.

In 2016, ISDA published a whitepaper, *The Future of Derivatives Processing and Market Infrastructure*¹, which set out a path forward for developing a standardized, efficient and compliant market ecosystem that supports the needs of all market users. The principles of this ecosystem would cover three key areas: common data standards; standardization and digitization of documentation; and standard processing models.

In line with this vision, ISDA has developed the Common Risk Interchange Format (CRIFTM) and the Common Domain Model (CDMTM)², which together create a powerful solution to standardize and further automate the exchange of risk data.

In recent years, the industry has embraced the ISDA CRIF as the standard template to hold and report risk data. Initially developed as part of the ISDA Standard Initial Margin Model (ISDA SIMM[®]) to enable the exchange of risk data between firms and facilitate initial margin reconciliations, the CRIF has evolved to cover the Fundamental Review of the Trading Book standardized approach (FRTB-SA) and standardized credit valuation adjustment (SA-CVA) capital models.

Using the CRIF standards and the CDM has several potential advantages:

- It leverages existing standards market participants are familiar with, avoiding the need to adopt new standards for a similar purpose;
- It establishes a robust and comprehensive framework for risk data representations, which are directly applicable as inputs into standardized capital models and the ISDA SIMM;
- It allows for a granular analysis of the drivers of capital and margin calculations and their relative importance, at asset-class and risk-factor levels; and
- Applying the CDM will help to partially automate the creation of CRIF files and ensure their validity, as well as enable automation of risk data reporting to regulators.

¹ The Future of Derivatives Processing and Market Infrastructure, September 2016, www.isda.org/a/UEKDE/infrastructure-white-paper.pdf

² www.isda.org/2019/10/14/isda-common-domain-model/

ISDA estimates that more than 200 firms are using the CRIF on a regular basis, including 40 globally active firms using it for the purposes of the FRTB-SA.

Widespread adoption of the CRIF also benefits regulators, allowing for the simple identification of risk drivers, easy computation of capital and margin amounts, and interoperability and comparability of CRIF files. ISDA has already licensed the CRIF to several regulators interested in using the standards.

Adoption of the CRIF standards could be further enhanced through use of the CDM, which will create opportunities for greater automation. This will enable a faster, cheaper and more reliable implementation of data collection and analysis than was possible in the past, enhancing the value of the exercise for both regulators and industry participants, ultimately leading to safer and more efficient markets.

There is an opportunity for the industry to collaborate with global regulators to adopt the CRIF as the standard for risk data and to leverage the CDM to further enhance CRIF processes. Preventing the proliferation of competing standards through the adoption of standardized solutions provides a solid basis for the further evolution of the derivatives processing environment, helping to reduce costs and inefficiencies.

The ISDA CRIF-CDM Value Proposition

Step 1: The combination of CRIF input data from firms' systems, CDM position data and trade reference data is absorbed by the CDM staging algorithm, which organizes and validates the relevant data entries (see Figure 1).

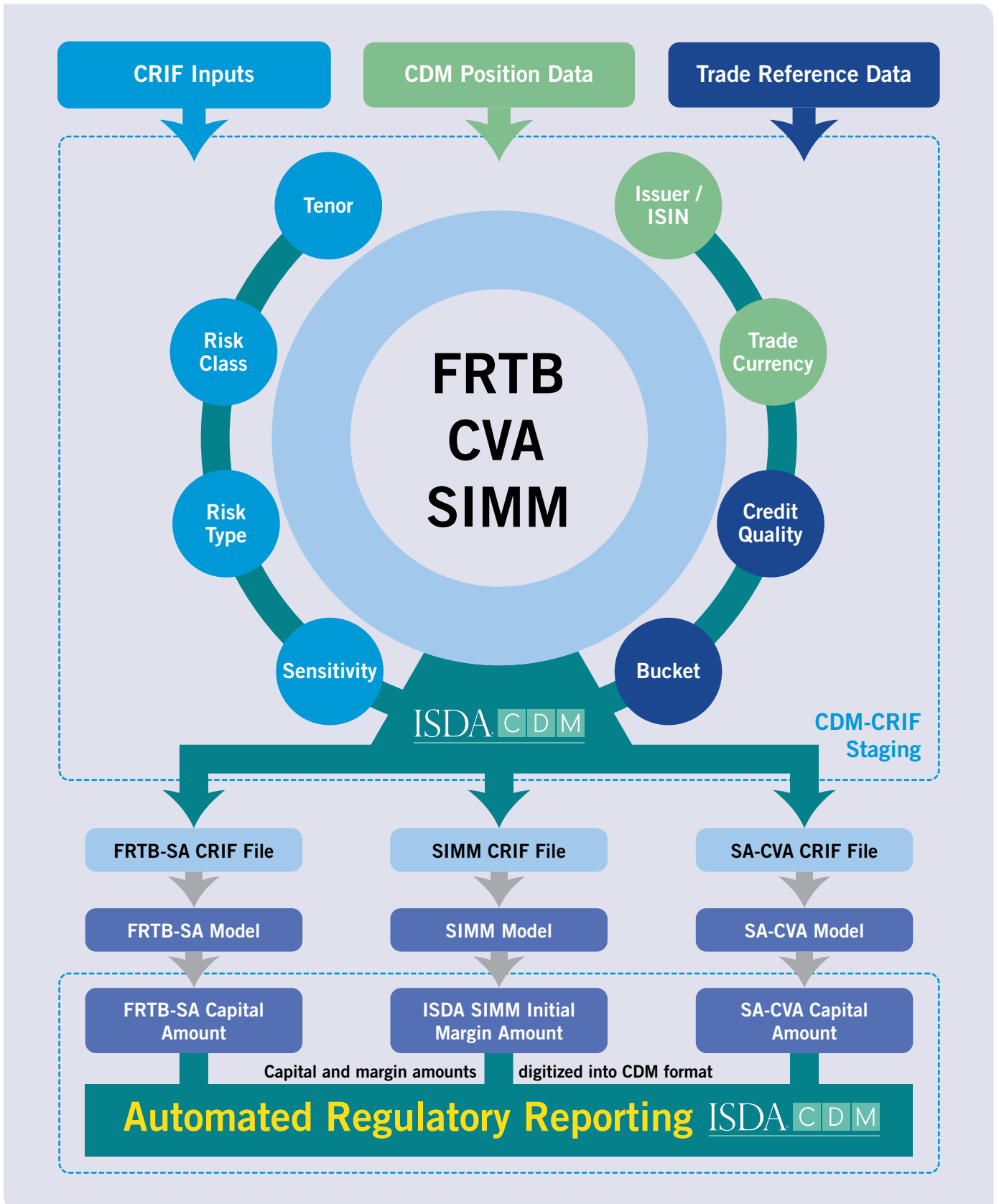
Step 2: The algorithm generates a set of distinct valid CRIF files, each elaborated to be readable by standard models such as FRTB-SA, SA-CVA and the ISDA SIMM.

Step 3: These capital and margin models subsequently generate the capital and margin amounts associated with each CRIF file, and the CDM is able to digitize and tag these amounts, which can ultimately be consumed directly by regulators and industry participants.

Proof of Concept

ISDA successfully conducted a CRIF-CDM proof of concept in January 2021, demonstrating the feasibility of the value proposition. A range of candidate trades were selected to form a portfolio to test the concept under the FRTB-SA rules. These steps were implemented, resulting in the creation of a valid CRIF file representing the relevant risk data inputs ready to be read by ISDA's FRTB-SA calculation engine, which computed the resulting capital amounts.

Figure 1: Vision of the CRIF-CDM Workflow



THE ISDA CRIF

Initially developed as part of the ISDA SIMM initiative, the CRIF was designed to standardize risk data that is entered into the ISDA SIMM to calculate initial margin (IM). It was established to ensure all ISDA SIMM users adopt a common format to exchange risk data so they can easily identify and investigate sources of potential bilateral IM mismatches and reconcile as appropriate. The CRIF is available as a simple column-based, machine-readable file, governed by a set of rules documented in the ISDA risk data standards, which are available for each standard model (the ISDA SIMM and the FRTB-SA and SA-CVA capital models).

In recent years, the ISDA Standardized Approach Benchmarking initiative³ has triggered the need for further standardization of risk data inputs for standard capital models, such as the FRTB-SA and SA-CVA. The aim is to allow participating firms to exchange risk data with ISDA to validate capital calculations and analyze the drivers of capital at the risk-factor level. In support of this benchmarking initiative, ISDA extended the CRIF to cover the FRTB-SA and SA-CVA risk capital models, with each use case governed by its own risk data standards.

The licensed ISDA CRIF standards now support multiple purposes and are being adopted by an increasing number of market participants, including:

- Vendors that want to provide ISDA SIMM margin reconciliations and FRTB-SA and SA-CVA capital calculation services, as well as capital management services;
- ISDA member firms using CRIF for model back-testing, benchmarking and other validation processes;
- Regulators collecting portfolio risk data from supervised firms to support standardized approach benchmarking exercises; and
- New firms that may benefit from the synergies offered by the CRIF standards in their interactions with regulators, vendors and ISDA.

The CRIF is a simple, robust and comprehensive risk data format that organizes and stores risk data inputs needed to compute ISDA SIMM margin and FRTB-SA and SA-CVA capital amounts. CRIF files are sufficiently intuitive to allow for visual inspection and can be semi-automatically generated by leveraging the CDM. The CRIF is specified for the set of relevant risk factors associated with each standard model, and can easily be extended to handle new risk factors in the future. Each CRIF file can be automatically processed by the relevant standard models to compute margin and capital amounts.

The CRIF standards are typically used for ISDA SIMM margin reconciliations and standardized approach capital benchmarking analyses. The risk factor information contained in a CRIF file allows users to easily identify the key drivers behind different ISDA SIMM margin amounts calculated for the same bilateral portfolio, or different capital amounts calculated for the same hypothetical benchmarking portfolio. The CRIF can be implemented as an excel file or in any other column-based file extensions like .csv or .txt, with defined data fields arranged in columns. The elements of a CRIF file can be textual (string), date or numerical, and their types can be context dependent.

Figure 2 illustrates the range of risk data formats an FRTB-SA CRIF file may contain.

³ For more information, visit: www.isda.org/2020/06/17/isda-sa-benchmarking/

Figure 2: FRTB-SA CRIF Risk Data Range and Formats

Risk Class	Risk Type	Qualifier	Bucket	Label 1	Label 2	Amount	Amount Currency	Amount USD	Label 3	End Date	Credit Quality
IR	GIRR_DELTA	EUR	2	0.5	EURIBOR 3M	10,000	GBP				
IR	GIRR_VEGA	EUR		0.5	1	10,000	GBP		0.15		
IR	GIRR_CURVATURE	EUR	2	-1.5		10,000	GBP				
Credit	CSR_NS_DELTA	ISSUER ABC	1	1	BOND	10,000	GBP				AAA
Credit	CSR_NS_VEGA	ISSUER ABC	1	1		10,000	GBP		0.15		
Credit	CSR_NS_CURVATURE	ISSUER ABC	1	-0.3		10,000	GBP				
Sec. ex-CTP	CSR_SNC_DELTA	ISIN XYZ	20	1	Curve XYZ	10,000	GBP				
Sec. ex-CTP	CSR_SNC_VEGA	ISIN XYZ	20	1		10,000	GBP		0.15		
Sec. ex-CTP	CSR_SNC_CURVATURE	ISIN XYZ	20	-0.3		10,000	GBP				
CTP	CSR_SC_DELTA	ISIN XYZ	1	1	BOND	10,000	GBP				
CTP	CSR_SC_VEGA	ISIN XYZ	1	1		10,000	GBP		0.15		
CTP	CSR_SC_CURVATURE	ISIN XYZ	1	-0.3		10,000	GBP				
Equity	EQ_DELTA	ISSUER ABC	2		SPOT	10,000	GBP				
Equity	EQ_VEGA	ISSUER ABC	2	1		10,000	GBP		0.15		
Equity	EQ_CURVATURE	ISSUER ABC	2	-0.3		10,000	GBP				
Commodities	COMM_DELTA	COMMODITY ABC	3	0	DELIVERY LOCATION X	10,000	GBP				
Commodities	COMM_VEGA	COMMODITY ABC	3	1		10,000	GBP		0.15		
Commodities	COMM_CURVATURE	COMMODITY ABC	3	-0.3		10,000	GBP				
FX	FX_DELTA	EUR	2			10,000	GBP				
FX	FX_VEGA	EURUSD		1		10,000	GBP		0.15		
FX	FX_CURVATURE	EUR	2	-0.3		10,000	GBP				
DRC Credit + Equity	DRC_NS_JTD / DRC_NS_M2M	ISSUER ABC	SOVEREIGNS	0.25	SENIOR	10,000	GBP		Amount	31/12/2028	AAA
DRC Sec. non-CTP	DRC_SNC_JTD / DRC_SNC_M2M	ISIN XYZ	RMBS EUROPE	0	NON-SENIOR	-10,000	GBP			31/12/2028	AA+
DRC CTP Decomposition approach	DRC_SC_JTD	Series 18 / Bespoke Portfolio	iTraxx IG / Bespoke Portfolio	ISSUER ABC	3 - 6 / Senior Non sec / Index Non sec	120,000	USD	120,000.00	1,000,000.00	31/12/2028	A-
DRC CTP Banking Book	DRC_SC_M2M	Series 18 / Bespoke Portfolio	iTraxx IG / Corporate ISSUER A / Bespoke Portfolio	ISSUER ABC	3 - 6 / Senior Non sec / Index Non sec	500,000	USD	500,000.00	1,000,000.00	31/12/2028	A-

Figure 3 provides a stylized example of how the FRTB-SA capital CRIF files from two distinct firms that have been generated for the same short credit default swap (CDS) transaction identify different factors, resulting in differences in output capital amounts.

Figure 3: Example CRIFs and FRTB-SA Capital Calculated on a Short \$1 Million CDS on Eli Lilly

FIRM A

Sensitivity ID	RiskType	Qualifier	Bucket	Label1	Label2	AmountUSD
47.a	GIRR_DELTA	USD	2	1	OIS	-17,100
47.b	GIRR_DELTA	USD	2	3	OIS	-21,500
47.c	GIRR_DELTA	USD	2	5	OIS	-24,300
47.d	CSR_NS_DELTA	Eli Lilly & Co	7	1	CDS	-25,600
47.e	CSR_NS_DELTA	Eli Lilly & Co	7	3	CDS	-268,000
47.f	CSR_NS_DELTA	Eli Lilly & Co	7	5	CDS	-4,326,000
Total FRTB-SA Capital:						69,077

FIRM B

Sensitivity ID	RiskType	Qualifier	Bucket	Label1	Label2	AmountUSD
47.1	GIRR_DELTA	USD	2	0.25	OIS 3M	-620
47.2	GIRR_DELTA	USD	2	0.5	OIS 3M	-1,300
47.3	GIRR_DELTA	USD	2	1	OIS 3M	-4,150
47.4	GIRR_DELTA	USD	2	2	OIS 3M	-12,600
47.5	GIRR_DELTA	USD	2	3	OIS 3M	-18,700
47.6	GIRR_DELTA	USD	2	5	OIS 3M	-33,400
47.7	CSR_NS_DELTA	Eli Lilly & Co	5	0.5	CDS	-2,250
47.8	CSR_NS_DELTA	Eli Lilly & Co	5	1	CDS	-15,700
47.9	CSR_NS_DELTA	Eli Lilly & Co	5	3	CDS	-54,000
47.10	CSR_NS_DELTA	Eli Lilly & Co	5	5	CDS	-4,450,000
Total FRTB-SA Capital:						135,861

Identification of Key CRIF Differences

Blue highlights the different choice of FRTB-SA credit spread risk bucket made by the two firms. Eli Lilly is a large conglomerate present in several sectors

Green identifies the different level of risk-factor granularity applied by the two firms, with Firm B decomposing risks across a more granular set of tenors

Yellow shows different sensitivity amounts are observed, with each firm applying FRTB-SA sensitivity calculations using its own pricing models

How the CDM Can Enhance Use of the CRIF

Derivatives markets have changed significantly since the financial crisis. In response to regulatory changes instigated by the Group-of-20 nations in 2009, most derivatives trades are now reported to a trade repository, clearing is more common and electronic execution is gaining momentum. These changes have had an impact on virtually all parts of the transaction process, from pre-trade execution through to lifecycle management and reporting.

But in focusing on meeting tight regulatory timelines, less attention has been paid to achieving operational and technological efficiencies. The complexity inherent in the new derivatives ecosystem is now putting derivatives market participants under considerable strain. Given the lack of opportunity to redesign embedded processes in order to meet regulatory deadlines, industry participants have struggled with a complex set of workflows that create challenges for continued compliance, efficiency and operational risk management.

Over time, each firm has established its own systems and its own unique set of representations for events, processes and risk data associated with the lifecycle of a trade. In parallel, regulators have in recent years proposed specific data collection templates firms should use to report financial information, including risk data. There is no advantage to organizations in maintaining their own distinct representation frameworks. This results in firms having to continually reconcile their trades to make sure they have the same information, as well as reformat internal financial data to fill regulatory templates. This is a significant drain on resources and curtails the potential for greater automation, increasing operational risk.

ISDA developed the CDM in response to the lack of standard data representations between market participants and within financial institutions. Firms can now use CDM components to implement post-trade processes and use shared logic to assess their trades and data for regulatory requirements. This results in consistent outcomes through the trade lifecycle and greater comparability in the data observed or collected. Having a single, common digital representation of derivatives trade events and actions also facilitates interoperability across firms and platforms, providing a bedrock upon which new technologies can be applied.

But effective automation can only be built on standardization, which is why the ISDA CRIF standards and the CDM can work together to achieve the goals of standardizing risk data representations and enhancing CRIF process efficiencies.

How Will it Work?

As illustrated in Figure 1, the CDM takes in combinations of CRIF data inputs, CDM position/trade data (which can be converted from Financial products Markup Language transaction data) and trade reference information. The CDM staging algorithm organizes, enriches and validates the relevant data inputs, then generates a set of valid CRIF files that are readable by standard models. These models, in turn, generate the relevant capital and margin amounts based on the CRIF input data. The CDM can digitize and tag these amounts in a consistent way with reference to the source portfolios or firms as necessary, which can ultimately be consumed by connected regulators or third parties.

Medium-term Regulatory Reporting Benefits

The CDM capabilities can provide regulators with access to an accurate and up-to-date instance of transaction risk data at any time, as well as the associated capital and margin amounts computed by each firm. This would help to reduce the current burdens associated with regulatory reporting. Systems based on the CDM and distributed ledger technology typically offer a structure that solves for these aims.

CONCLUSION

This whitepaper has been developed to set out a vision of what is required to reduce the operational complexity and costs associated with the proliferation of standards aimed at capturing portfolio risk data. ISDA believes there is a timely opportunity for regulators and the industry to work together to promote a more uniform approach to risk data formatting and reporting.

A common and standardized approach to risk data enabled by the adoption of the CRIF is preferable to each firm or regulator trying to address the shared challenge of capturing and organizing risk data on its own – which would ultimately lead to sub-optimal, duplicative and more expensive processes.

Leveraging the CDM for the CRIF would further improve automation, facilitate consistency of CRIF-related processes, improve reporting and help promote safe and efficient markets.

Wider adoption of the CRIF and CDM would contribute towards standardizing the market as a foundation for structural change. Steps are already being taken towards this. For example, ISDA has been supporting the work of the Bank of England in developing common data standards⁴, and a number of industry initiatives already leverage the CDM. ISDA also plans to conduct a real-world pilot of the proposed CRIF and CDM framework in collaboration with regulators to further demonstrate the value proposition.

As the Basel III requirements are implemented, the industry and regulators have the opportunity to take stock and closely collaborate to adopt the CRIF as the industry standard, leveraging the CDM to form a standard approach to risk data.

⁴ Transforming data collection from the UK financial sector, January 2020, www.bankofengland.co.uk/-/media/boe/files/paper/2020/transforming-data-collection-from-the-uk-financial-sector.pdf

ABOUT ISDA

Since 1985, ISDA has worked to make the global derivatives markets safer and more efficient. Today, ISDA has more than 925 member institutions from 75 countries. These members comprise a broad range of derivatives market participants, including corporations, investment managers, government and supranational entities, insurance companies, energy and commodities firms, and international and regional banks. In

addition to market participants, members also include key components of the derivatives market infrastructure, such as exchanges, intermediaries, clearing houses and repositories, as well as law firms, accounting firms and other service providers. Information about ISDA and its activities is available on the Association's website: www.isda.org. Follow us on [Twitter](#), [LinkedIn](#), [Facebook](#) and [YouTube](#).