Empowering the Heavy Equipment Industry to Streamline Chemical Management and Compliance Efforts with DXC CDX

Chuck LePard, IMDS & CDX Americas Representative
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DXC Public

Speaker Introduction

Chuck LePard

Executive Consultant, IMDS & CDX Americas Representative

Chuck.LePard@dxc.com LinkedIn Profile

- **Degrees in Electrical & Computer Engineering and Computer Science**
- **Honorable Discharge, United States Navy**
- **40 Years EDS / General Motors / Hewlett Packard / HPE / EntServ / DXC**
- **Decades of plant floor and engineering experience in related areas**
- **Advisor and committee member with multiple manufacturing industry groups**
  - Automotive Industry Action Group
  - International Aerospace Environmental Group
  - Association of Equipment Manufacturers
  - Responsible Materials Initiative
- **Leader in Standards Development organizations**
  - American National Standards Institute (ANSI), International Standards Organization (ISO) Technical Committee TC-111 on Environmental Sustainability Data Exchange
  - IPC 2-18 175x family for Product Declaration and Compliance reporting

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Topics to cover

Who is DXC Technology (DXC)

The Business Challenges

What is the Compliance Data eXchange (CDX)

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The Business Challenges

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Primary Motives for ESG Metrics Reporting

Increasing liability

Economic Viability

Create competitive advantage
- Minimize Costs (Mfg. process, product lifecycle, recycling)
- Resource Management

Society

Corporate image - reputation impact
- Investor relations and economic success
- Sustainability as business objective

Laws & Regulations

Compliance
- A multitude of regulations per region / market
- Regulation volume is rapidly increasing trend

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Regulatory Compliance as a Safety Consideration

ERA OF 1st WORKPLACE PROTECTIONS

1910's
Few restrictions

1920's
First employment rights laws

1930's
First employee machinery safety laws

1940's
First employee plant safety zone laws

1950's
First employee personal protective equipment laws

ERA OF 1st PURCHASER PROTECTIONS

1960's
First consumer rights regulations

1960's
First materials safety legislations

1970's
First product materials safety restrictions

1970's
First product operation safety legislations

ERA OF 1st WORKPLACE ENVIRONMENTAL PROTECTIONS

1980's
First wastewater/water pollution restrictions

1990's
First air pollution restrictions

1990's
First broad workplace chemical restrictions

1990's
First product labelling and classification laws

ERA OF 1st PURCHASER ENVIRONMENTAL PROTECTIONS

2000's
First Product lifecycle chemical law (ELV)

2000's
First broad product-category laws (RoHS)

2010's
First universal product-category laws

2020's
First circular economy laws (WFD, TSCA)

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Global sales require managing regulatory, client and social obligations to retain and grow market access and project a positive corporate responsibility image

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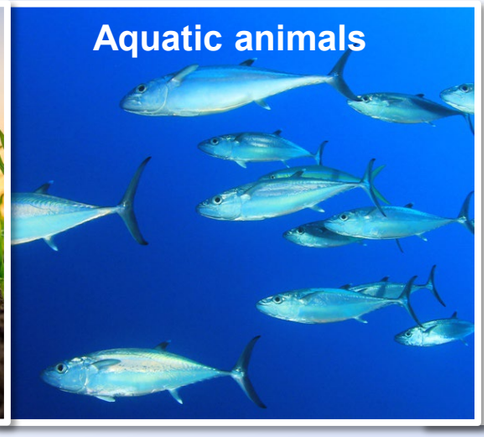
How recent regulatory chemical compliance began

- In the 1980's across Europe, miscarriages and birth defects were increasing at a growing rate.
- Studies were commissioned to determine cause
- In the early 1990's, the European Union recognized a severe problem with heavy metal poisoning
- Improper disposal of automobiles, appliances, electronics, etc. was poisoning the drinking water

- This clear, present danger required immediate action
- Automotive was the first target for remediation, via the **End of Life Vehicle (ELV)** legislation
- ELV requires Automotive OEMs selling in EU to identify, reduce, and eliminate heavy metals in their products

Heavy metal toxicity: Abnormal growth and development



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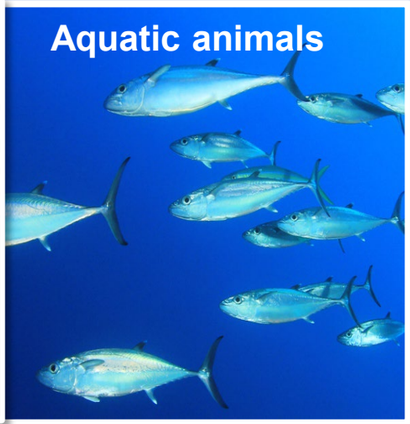
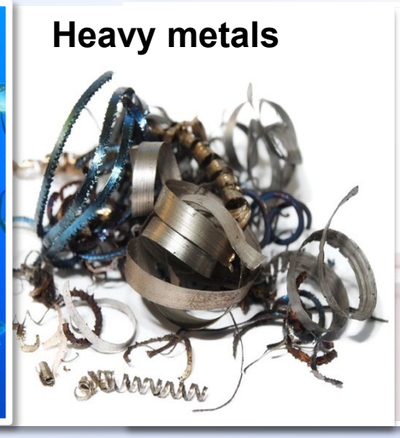
Where regulatory compliance went next

- ELV has been effective at reducing the rate at which heavy metal contaminants are introduced into the environment
- Next causes of contamination are electronics & industrial products
- Also identified as “Substances of Very High Concern (SVHC’s) were phenyl and phthalate plasticizers, used to enhance performance, e.g. instrument panels, wire insulation, housings, Tupperware®

- In the mid 2000’s European Union enacted “Restriction of Hazardous Substances (RoHS)”, and “Waste Electrical & Electronic Equipment (WEEE)”, exempting a decreasing number of product categories
- RoHS and WEEE have both been further extended by new regulation versions during the intervening years
- Most global jurisdictions have adopted a version of RoHS and WEEE
- RoHS compliance is necessary for CE marking, required to import into or sell in-scope products in the European Union & other areas

Heavy metal toxicity: Abnormal growth and development





Compliance

RoHS compliant

CE

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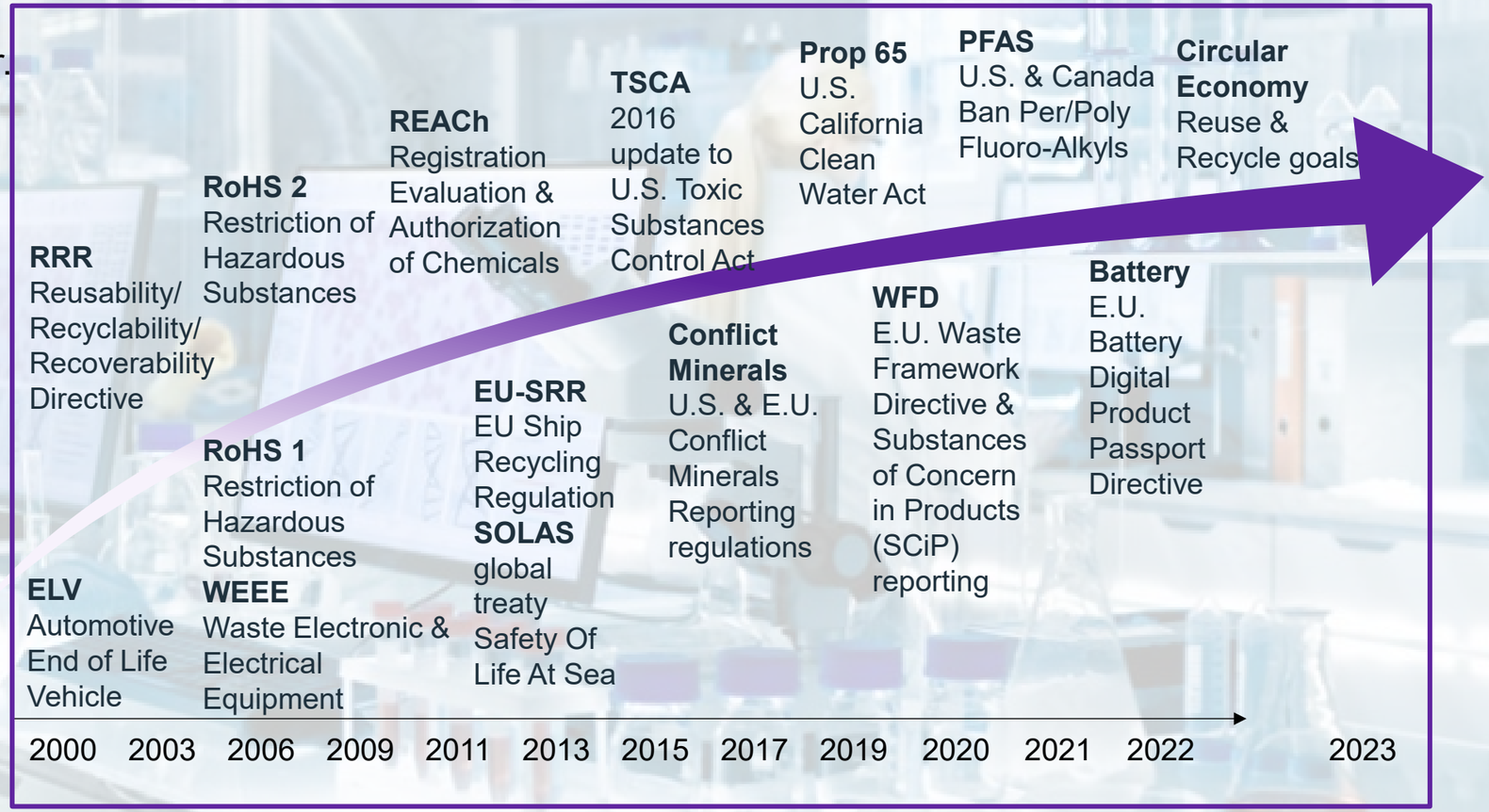
Where regulatory material & product compliance is today

EU REACh:
247 CL SVHC substances as of January 2025,
95+% of products in scope, Multiple changes per year.
5 new substances added already in 2025 alone!

California Proposition 65 – Revised Jan. 1, 2025.
Requires detailed labels on products containing SVHCs and allows "bounty-hunters" to bring lawsuits.
SVHC Substance list continues to grow.

US Toxic Substance Control Act (TSCA) reform
Strong support 2020-24, new action hold for now.
PFAS prohibitions partially in effect. In 2021, PIP-3:1 Persistent, Bioaccumulative & Toxic (PBT) provision almost halted U.S. hydraulic equipment production

Added Corporate Responsibility legislations
- U.S. / E.U. Conflict Minerals / Sustainability
- UK Modern anti-Slavery & Reusable Packaging
- E.U. Supply Chain Due Diligence Directive (CSDDD)



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How the Product Lifecycle Affects Compliance

Compliance is a moving target, regulations add/change often	Products need to be recertified Products need to be adapted / re-designed	Full Material Disclosure (FMD) is the strongest mitigation solution for this risk
Product specifications change throughout the supply chain	Products need to be recertified Types need to be recertified / re-approved	For complex products, changes several layers down may not be obvious at the finished product layer
Supplier parts change: design and/or specs govern change	Products need to be re-certified Products need to be adapted / re-designed to resolve changes	All this needs revised information from the supply chain
There are only reliable two ways to obtain the needed information:	Test samples of the finished product, or obtain answers from the source	

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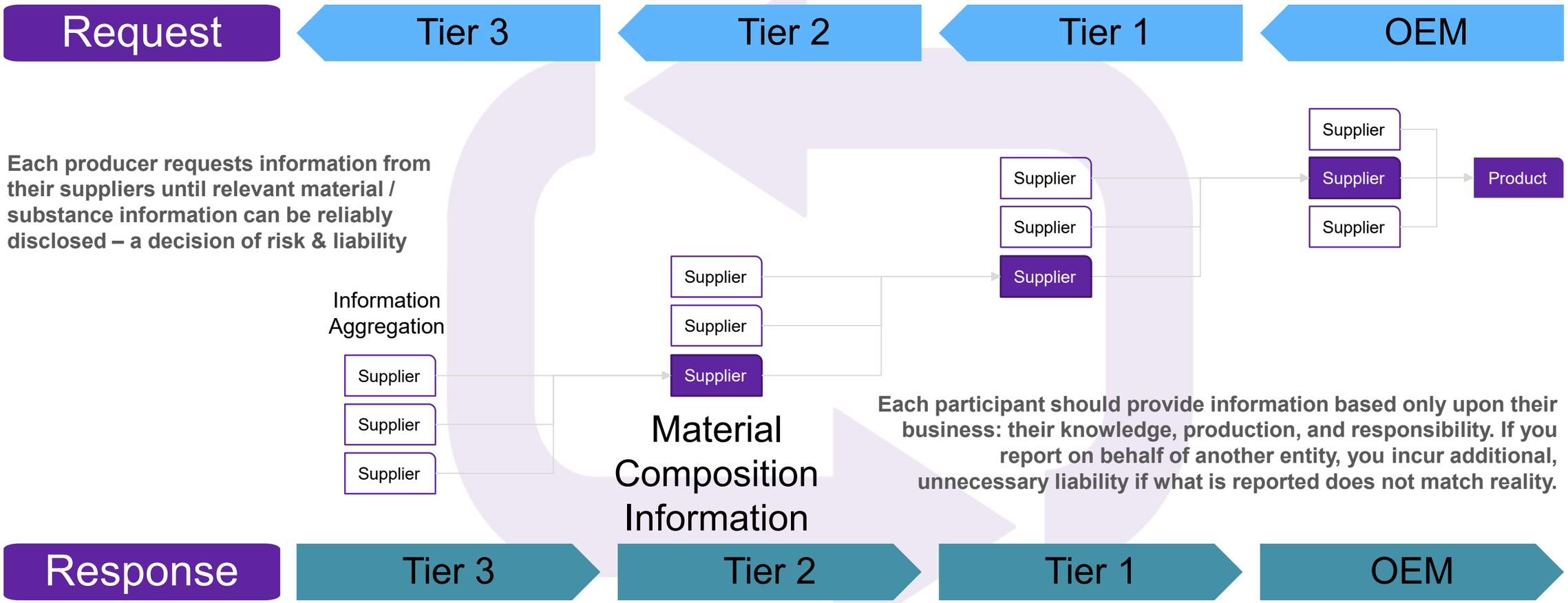
Sourcing of Compliance Data

DXC Philosophy: The direct manufacturer of a product best understands that product



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Challenge: Disparate Information Distributed throughout Your Supply Chain

Inconsistency in information sharing:

- Information exists in many different places and in different forms, therefore, companies need various systems to receive the information

Data Security Risk:

- E-mail method exposes proprietary business information to interception
- Data collection throughout the supply chain is mostly arbitrary, sometimes even for same downstream consumer, depending on segment / scheme
- Risk of inaccurate data – each supplier reports the same information in many different formats due to lack of standard forms

Data Analysis Inconsistency Across the Industries:

- Consumers at downstream end have their own means of analysis, while upstream suppliers possess the knowledge

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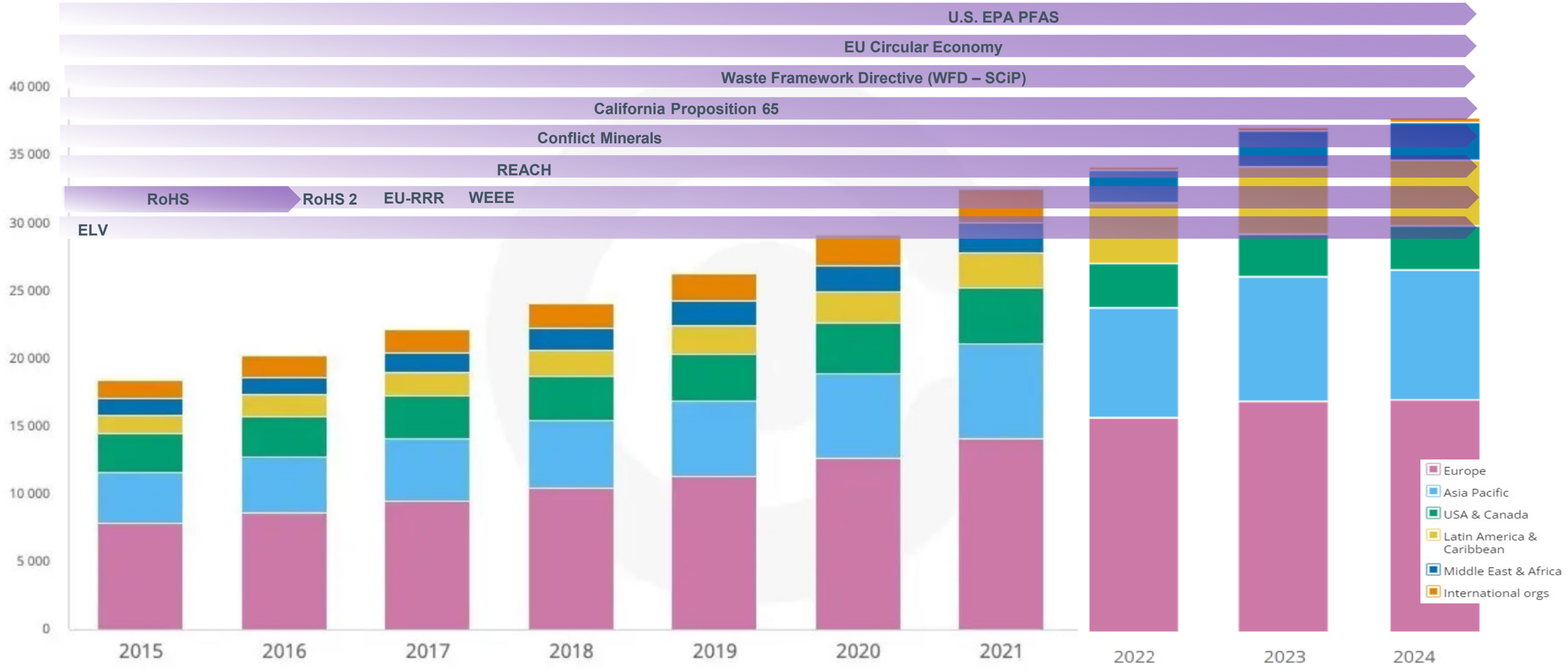
New Compliance Regulations

Per Region / Year



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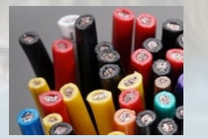
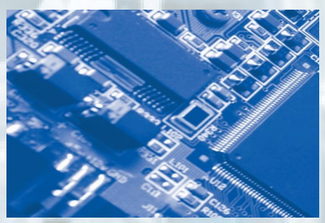
Where is the PFAS?

Compliance & Risks

Flexible plastic
Cable and wire insulation
Conduit and conduit connectors



Smudge resistant touch screens



Circuit board films
Conformal coatings
Cleaning fluids for microelectronics
Semiconductor manufacturing aids

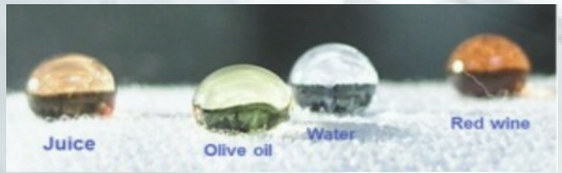
Hydraulic fluids
Gaskets
Seals
Hoses
Valves
Tubes
Sealant
Flexible joints
Pipe & tank linings

Fire fighting foam
Chemical / Biological resistant PPE
Bacteria / virus resistant fabrics
Dirt resistant fabrics
Waterproof fabrics

Paints
Non-stick coatings
Stain-resistant sprays and treatments
Self-cleaning coatings for weather resistance

Lubricants
Potting Gels
Adhesives
Greases
Surfactants

Stain resistant
fabric treatments



Batteries
Shock absorbers
Bushes and Bearing surfaces

Refrigerants/
F-Gases

Adobe Stock | #201606422

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PTFE Usage in Industry today

Adhesives
Bacteria / virus resistant fabrics
Batteries
Bushes and Bearing surfaces
Cable and wire insulation
Chemical resistant PPE
Circuit board films
Cleaning fluids (electronics)
Conduit & conduit connectors
Conformal coatings
Dirt resistant fabrics
Fabric treatments
Fire fighting foam
Flame resistant
Flexible joints
Flexible plastic
Gaskets
Greases
Hoses

Hydraulic fluids
Lubricants
Non-stick coatings
O-Rings
Paints
Pipe & tank linings
Potting Gels
Sealant and Seals
Self-cleaning coatings
Semiconductor manufacturing aids
Shock absorbers
Smudge resistant screens
Stain-resistant surfaces
Surfactants
Tubes
Valves
Waterproof fabrics
…

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Who is DXC Technology?

DXC at a glance

$13.7B
FY24 revenue

60+
years of innovation delivering mission-critical systems for customers

125,000+
employees worldwide

70+
countries

200+
partner ecosystem with best-of-breed partners

200
customers in the Fortune 500

AA
rating from MSCI for outstanding ESG performance (disclaimer)

#294
in the 2024 Fortune 500

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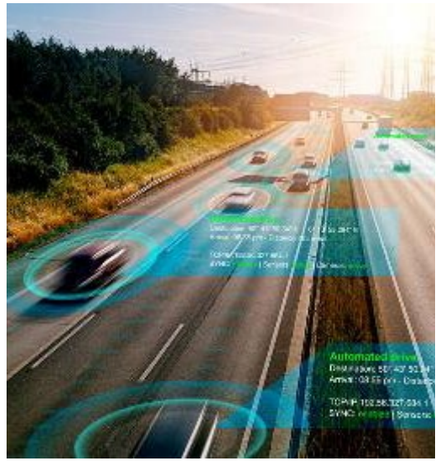
Serving customers around the world in diverse industries



AUTOMOTIVE
MANUFACTURING
FINANCIAL SERVICES
PUBLIC SECTOR
AEROSPACE
DEFENSE
CONSUMER
RETAIL
HEALTHCARE
LIFE SCIENCES
INSURANCE
TRAVEL
TRANSPORTATION
ENERGY
UTILITIES
OIL & GAS
TECHNOLOGY
MEDIA
TELECOM

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How DXC Technology became involved

In the early 90's, EU legislators approached leading European auto makers to begin voluntary heavy-metal reporting

The EU OEMs discovered they had inadequate information on substances in vehicles, and began programs to collect this information from their suppliers, using spreadsheets, databases, engineering systems, supplier portals, etc.

The OEMs learned Tier-1s didn't have chemical composition either, & they needed to reach deep into supply chains. These companies conducted several tests and determined a shared approach was most effective and lowest cost.

After several years, the OEMs were still unable to answer legislator questions about SVHCs.
The EU legislature began the process to make reporting mandatory using the ELV legislation.

When ELV was enacted, the Auto OEMs contracted DXC (then EDS) to develop International Material Data System (IMDS), requiring reporting of 100% Full Material Declarations, with <=10% masked as confidential/proprietary.

Since introduction in 2000, IMDS use has expanded to virtually all Auto OEMs, ~240,000 supplier companies, 495,000 users, & > 90 Million product declarations, with more than 10 million added in last 2 years.

MATERIAL DATA SYSTEM

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How DXC Technology is involved today

The progress made through success of these programs in Europe has led to similar programs in virtually all other jurisdictions

HP separated into HP and HPE, with IMDS and CDX transitioning to HPE. HPE sold their Enterprise Services organization, which merged with CSC to create DXC Technology

We have updated CDX with over 20 releases since its introduction, each including client feedback, regulatory changes, and updated functionality

CDX compliance.data.exchange

In 2011, using our incomparable experience in compliance reporting and our experiences as an electronics OEM (HP) as a basis, we released CDX

Over the past 8 years, CDX has grown and expanded to address the concerns of most discrete product manufacturing and sales companies, and a wide range of the most common material, corporate responsibility, and sustainability concerns.

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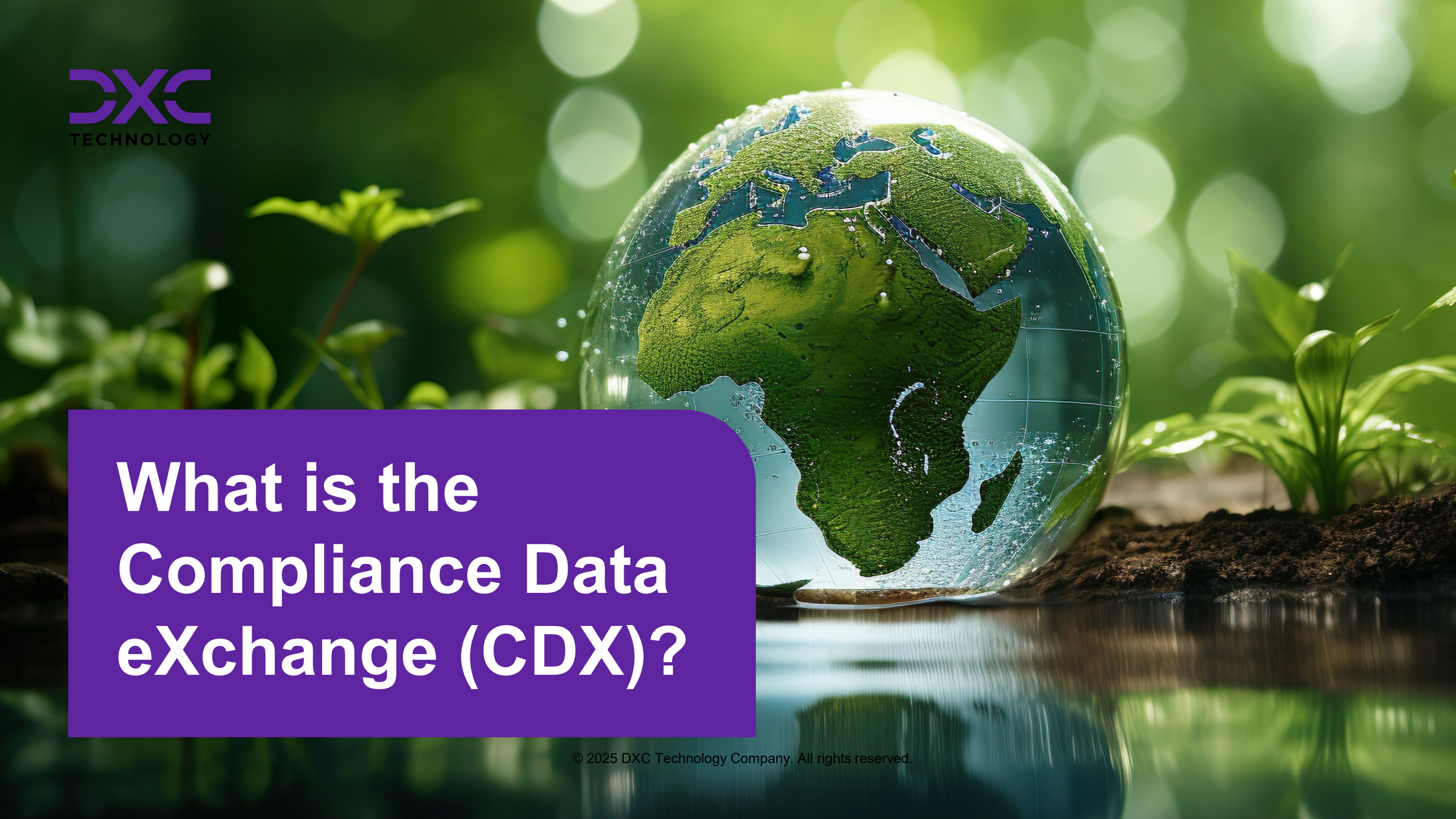

What is the Compliance Data eXchange (CDX)?

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What is Compliance Data eXchange?

A SaaS Portal in the cloud to communicate with suppliers and customers on materials in the supply chain and their compliance with legal requirements

A service providing support for Chemicals and Regulations

(CDX Chemical Service)
REACH (e.g. AXIV, AXVII), RoHS (exemptions), China RoHS, CalProp65, Packaging, Batteries, IMO…
support for standardized materials (CDX Material Service)

An application in the cloud which can be connected to company internal systems

Provides the option for Material Compliance Reporting and as well Conflict Minerals Reporting (RMI CMRT) and to analyze material declarations against many international regulations
Can import and export declarations in different formats
IMDS, IPC1752A, IPC1754, IPC1755 (CMRT), IEC62474

Free of investment for Hardware or Software and ready to use, immediately

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CDX: DXC's Proven Solution for Chemical Management

IMDS use is reserved exclusively for the on-road vehicle industry, with a few exceptions for similar product manufacturers willing to accept the stricture that only Automotive and On-Road vehicle OEMs have a voice in IMDS capabilities

CDX leverages the proven functionality and knowledge of DXC with IMDS, along with our expertise in Cloud solutions, to provide manufacturers with a secure, centralized web application which accurately gathers and analyzes material content data throughout your entire global supply chain.

CDX uses an established, common framework that provides quality global reporting to various legal requirements for a range of products, whatever you manufacture, assemble or sell.

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Benefits of Using CDX

Automation

- Saves manual effort, time and money while gaining a better overview, higher quality data and faster access to information for compliance reporting
- Aggregates information while providing high-level security and confidentiality

Cost Model

- Uses services in a flexible manner, based on a “pay per use” approach
- Requires no investment for hardware or software, or costly, time-consuming implementation projects

Cross Industry Solution

- Globally, meets industry requirements for reporting and analysis and Works well within all industries
- Data efficiency, provides only the information related to a company’s products, and requests material information for components and materials from that company’s suppliers, resulting in the most efficient data collection

Security

- Data Security at no additional cost

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Benefits of Using CDX

CDX provides the following advantages to its customers:

- Saves manual effort, time and money while gaining a better overview, higher quality data and faster access to information for compliance reporting
- Maximizes data security by permitting access only to a company's products, and requests part and material information for from the specific validated suppliers, resulting in more accurate and reliable data collection
- Meets industry requirements for reporting and analysis
- Requires no investment for hardware or software, or costly, time-consuming implementation projects
- Aggregates information while providing high-level security and confidentiality
- Uses services in a flexible manner, based on a "pay per use" approach
- Works well within all industries and geographies
- Regulation and chemistry updates are provided by DXC and its partners, reducing costs and overhead

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DXC Enhances CDX several times each year

- The needs of our new and existing customers are at the center of everything we do.
- Many CDX enhancements come from ongoing dialogue with our customers.
- Ongoing enhancements and refinements ensure that CDX best serves our customers' compliance requirements, both today and in the future.
- We stay ahead of new and changing compliance regulations across all industries.
- Everyone using CDX sees changes simultaneously eliminating the lag in supply chain updates that plague other solutions

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Standard Levels of reporting

ONE-LEVEL DECLARATIONS ★

Declaration of conformance/ compliance (DoC) Requires attachment specifying regulatory scope of conformance

PARTIAL DECLARATIONS ★★

Reports substances in specified scope, i.e. regulation or declarable substance list (DSL) Substances not within the specified scope are not required

FULL MATERIAL DECLARATION (FMD) OR 100% DECLARATION ★★★

The weight of reported substances equals the weight of finished product, +/- tolerance. Confidential or proprietary substances not in regulatory scope may be masked or not disclosed, often up to a defined threshold, e.g. in Automotive, the limit is 10%

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Reasons DXC recommends striving for Full Material Disclosure

FMD, e.g. IMDS-style reporting, offers the most bang for the buck

- The greatest capability for data validation
- A measure of future-proofing against new and/or changed regulations
- Maximizes sustainability benefits beyond risk avoidance
- Reduce total cost & effort necessary to maintain product compliance

Declarations to a regulation or DSL scope

- Have limited value when regulations and/or products change
- Require constant re-solicitation of supply chain to remain updated to last year's requirements

One-level declarations often lack supporting documentation

Salesman: What answer do I give so you buy my product?

Anything other than FMD is comparable to driving forward while looking backwards!

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FMD can significantly improve reporting quality

- CDX automatically conducts more than 100 validation checks
- Email or file submissions are more vulnerable to erroneous or unauthenticated declarations
- It’s difficult to ensure data accuracy, even when using industry standard formats
- You receive more accurate, higher quality Material Data Sheet (MDS) supplier submissions, which saves you and your suppliers time and money, while improving your MDS quality

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Open Letter about Full Material Disclosure with up to 10% non-declarable Intellectual Property (IP) Protection

AEM
Association of Equipment Manufacturers

Heavy Equipment and the need for Full Material Disclosure

The global compliance environment is seeing an unprecedented increase in the number of regulations directly impacting the ability of Original Equipment Manufacturers (OEMs) to sell heavy equipment products around the world. Large markets, like the United States, European Union, and China continue to expand their chemical control laws [See HEDSL Regulation List], with smaller states and countries starting to introduce new restriction every year.

Furthermore, the scope and focus of these regulatory challenges are expanding to include additional provisions beyond the traditional rules focused on chemical safety. These include tracking and reporting on critical raw materials, extended producer responsibility laws, and life cycle assessment reporting metrics.

All these rules place additional compliance requirements, resource constraints, and complexity on manufacturers. Increased product complexity and deeper supply chains further complicate the industry's compliance efforts. To meet this challenge, additional resources and a more comprehensive approach will be required to mitigate the industry's compliance risk. {continues}

http://www.aem.org/safety-product-leadership/heavy-equipment-declarable-substance-list-hedsl
Heavy Equipment and the Need for Full Material Disclosure

AEM HEDSL and the HEDSL Committee

The HEDSL Committee is comprised of professionals from AEM member companies

- HEDSL is Maintained by the HEDSL Committee of the Substance Compliance Council of AEM
- Original Equipment Manufacturers, supply chain companies and service providers participate.
- Leverages relevant data from the Global Automotive Declarable Substances List (GADSL.org)
- Updated at least once per year, typically in March following the GADSL release cycle
- Located at https://www.aem.org/safety-product-leadership/heavy-equipment-declarable-substance-list-hedsl or search AEM HEDSL using any reputable search engine
- Questions for HEDSL substance_submissions@aem.org
- Member of AEM want to join HEDSL substance_submissions@aem.org
- Member of AEM wants a chemical reviewed for addition, deletion, or status change? Submit a “HEDSL Substance Request” on the AEM website as noted above.

http://www.aem.org/groups/heavy-equipment-declarable-substance-list-committee-hedsl

CDX
Demo

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Live CDX Demonstration

1. Streamline compliance with Heavy Equipment Declarable Substances List (HEDSL) & client requirements using reusable product declarations
2. Transition from Partial to Full Material Declarations (FMDs) with Intellectual Property (IP) protection, aligned with AEM guidance
3. Simplify data collection with expert-curated PFAS (per- and polyfluoroalkyl substances) lists
4. Seamlessly import and incorporate IPC-1752A, IPC-1754, and IEC-62474 declarations
5. Leverage supplier declarations to parallel reality and create digital duplicates of products
6. Generate version-managed HEDSL compliance and sustainability declarations
7. Ensure compliance with REACH, TSCA, and California Prop 65
8. Reduce compliance efforts for evolving regulations and client demands.

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Chemical Experts Maintain Global Regulations

CDX Chemical Service included

- Chemical Service experts maintain substances, substance groups and global regulations
- For IPC1752A, ELV, and RoHS Exemptions are maintained by the Chemical Service, users can select the appropriate ones for their components
- Missing substances in CDX can be requested from users to be added

RoHS

EC Declaration of Conformity attached ☐

Statement of manufacturer for RoHS attached ☐

Name	CAS No.	D/P	Limit value / Re	Entry	Portion	Weight	Material	Exemption
Lead	7439-92-1	P	0.1%	E2009	4.0 %	1.2 g	Material_RoHS	Lead in solders for se
Mercuric oxide (re	21908-53-2	P	0.1%	E2009	2.0 %	0.06 g	Material_RoHD	For general lighting pu

REACH

SVHC CL

Name	CAS-Nummer	D/P	Grenzwert / Beschränkungsbedingungen	Eintrag	Mengena	Weight	Material
1,2,3-Trichloropr	96-18-4	D	0,1, however prohibited if material is new	E2011	3.0 %	0.6 g	REACH Materia
Lead chromate	7758-97-6	D	0,1, however prohibited if material is new	E2010	87.5 %	17.5 g	REACH Materia
Potassium-dichro	7778-50-9	D	0,1, however prohibited if material is new	E2010	2.0 %	0.4 g	REACH Materia
Tris(2-chloroethy	115-96-8	D	0,1, however prohibited if material is new	E2010	5.5 %	1.1 g	REACH Materia

REACH Annex XIV

Name	CAS-Nummer	Nr.	Datum	D/P	Grenzwert / Beschrän	Eintrag	Mengena	Weight	Material
Lead chromate	7758-97-6						87.5 %	17.5 g	REACH Materia
Potassium-dichro	7778-50-9						2.0 %	0.4 g	REACH Materia
Tris(2-chloroethy	115-96-8						5.5 %	1.1 g	REACH Materia

REACH Annex XVII

Name	CAS-Nummer	Nr.	D/P	Grenzwert / Beschrän	Eintrag	Mengena	Weight	Material
1,4-Dichlorobenz	106-46-7					2.0 %	0.4 g	REACH Material
Benzene	71-43-2		P	1. Shall not be used ir	E2009	2.0 %	0.4 g	REACH Material

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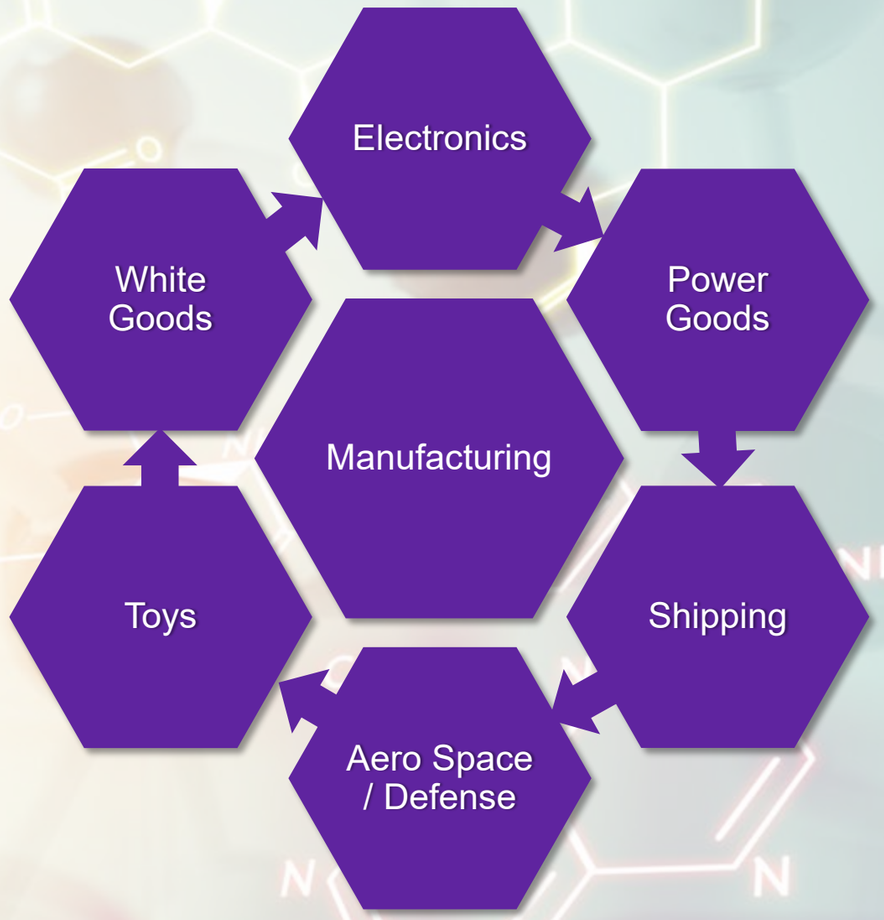
CDX Addresses Requirements of Different Industries

CDX, leveraging on 20 years of IMDS experience, is a more flexible materials compliance management solution and has open rules (e.g., full material or partial material declarations, one level) suitable for all industries.

- Substance and Material Management
  - Centrally provided catalog of substances and materials ensures data quality
  - More than 10,000+ standard metals with compositions and norms
- Embedded Workflow Management
  - Through CDX inbox and outbox, user can forward MDSs and CMDs quickly and transparently to customers and suppliers.
- Analyses and Reports
  - With DXC CDX, you can analyze an individual MDS, several in-house MDSs or several suppliers' MDSs according to the source and disposition statement
- Embedded Conflict Minerals Declaration (CMD) Manager
  - Supports creating a CMD report.
- SAP — Integration with Client's Systems
  - Interface to exchange data between CDX and client's systems using CDX Webservices interface
- CDX multi-industry clientele helps avoid the "Group Think" phenomenon.
  - When you collaborate only with others who do similar work, it is easy for an approach to seem like the correct solution, even when it isn't.



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CDX Helps to Onboard Your Suppliers

CDX connects you with suppliers registered in CDX and if suppliers are not yet registered, then CDX can generate e-mails to inform them about your needs

Supplier

MDS requests

MDS

Pure substance
Pure substance groups
Basic materials

MDS
Pure substance
Pure substance groups
Basic materials

In-house System e.g. SAP EHSM

MDS requests

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Integration of Information Using CDX Web Service

Connect collected information with your internal systems and processes

EH&S
Environment, Health and Safety

PDM
Product Data Management

PLM
Product Lifecycle Management

ERP
Enterprise Resource Planning

Local Integration

System Connection

Data Conversion

Workflow Control

Additional Functionalitiy

CDX Web Service Interface

Standard Data

MDSs

Published MDSs

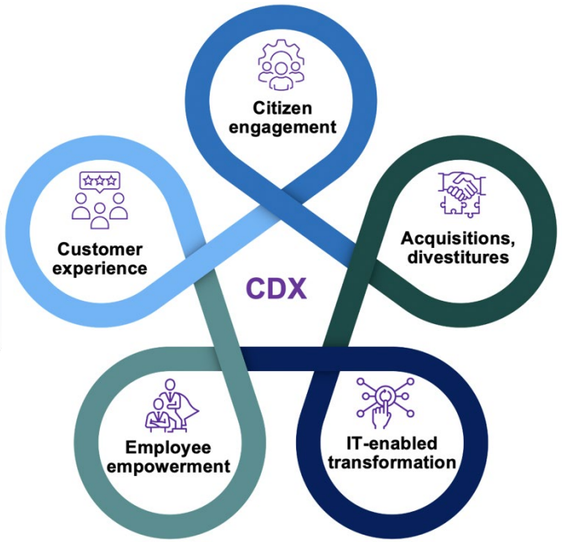
Special Reports

Requests

CMD

BSL

Attachments



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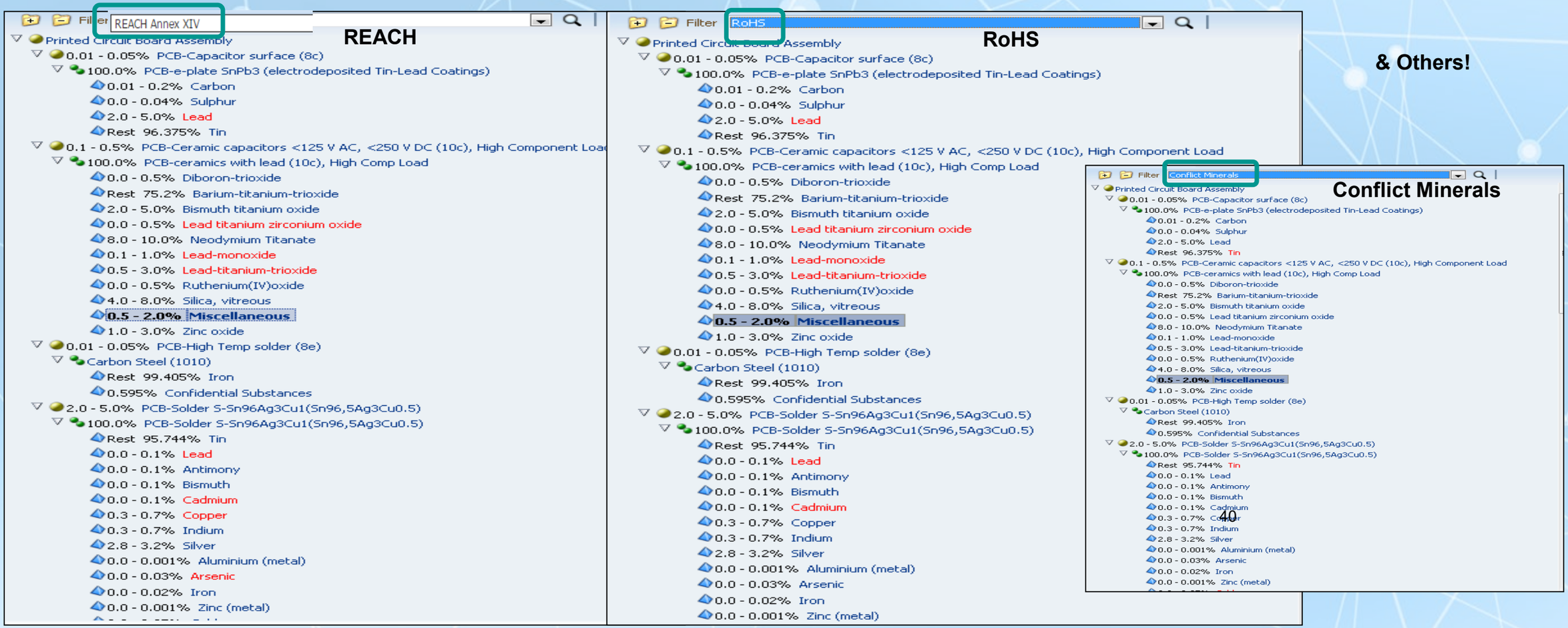
CDX: One solution to support many regulations



& Others!

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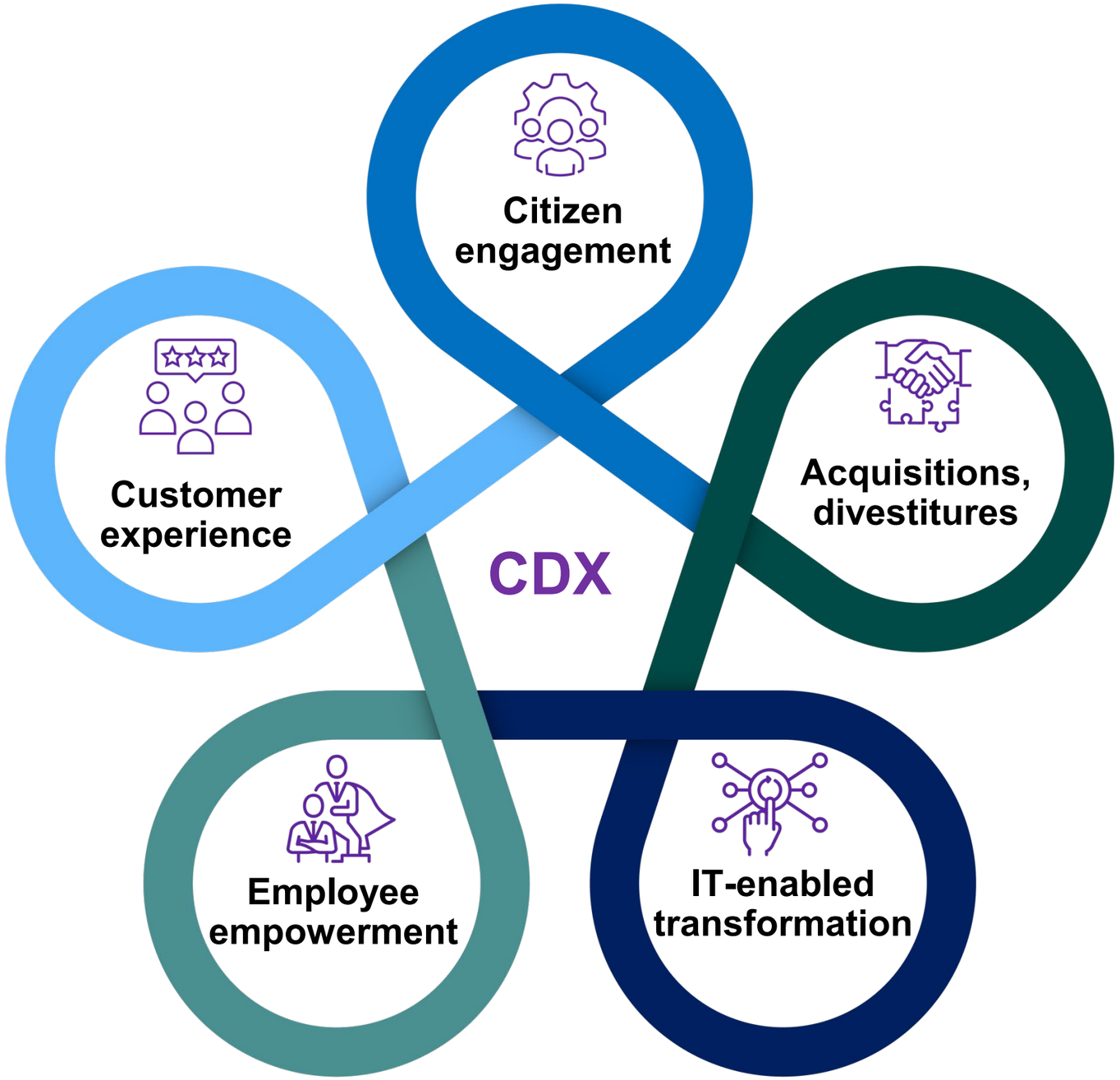
CDX – Backed by the Strength of DXC Technology New, but not born yesterday

From the leading pure-play supplier in cloud services, material compliance solutions, and secure supply chain submissions for over 25 years



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