DATAFROND | 2026 PTC USER CONFERENCE

Driving Supply Chain Resilience

with Rules-Based Product Definition in PTC Windchill

Advanced Supplier Management for Supply Chain Risk Mitigation

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Datafrond is a PTC Partner, a specialized technology services firm with deep-rooted expertise in Product Lifecycle Management (PLM), delivering end-to-end Windchill solutions that help engineering and manufacturing organizations streamline product development throughout the Product Lifecycle. Datafrond proprietary “PLM-IN-A-BOX” and “Frond-Sentry” AI Solutions enable businesses to accelerate time-to-market, reduce operational complexity, and maintain a single source of truth for product data across the enterprise.

Building on a strong PLM foundation, Datafrond has expanded its capabilities into cutting-edge Artificial Intelligence solutions designed to enhance and automate the workflows that PLM practitioners rely on every day. Datafrond AI offerings bring intelligent automation, natural language search, and predictive analytics directly into the product lifecycle — empowering engineers to surface insights from vast product data, streamline document processing, and make smarter decisions faster. By combining decades of Windchill domain knowledge with modern AI innovation, Datafrond uniquely bridges the gap between traditional PLM expertise and the next generation of intelligent engineering solutions.

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Why This Matters (Beyond Tier-1 Automotive)

Four converging pressures create risk for Tier-1 manufacturers

- Applies across Automotive, Industrial, and Aerospace & Defense contracting environments
- Compliance and sourcing constraints must be governed as part of product definition
- Goal: scalable supplier governance that improves traceability and reduces risk

From BOM Reporting to Governance Outcomes

Four converging pressures create risk for Tier-1 manufacturers

- Avoid limiting the story to a simplified report — focus on reusable governance patterns
- Anchor the solution in industry challenges and compliance outcomes, not only Windchill mechanics
- Set up the case study as proof of scalability and measurable impact

Future Evolution (Next 6–12 Months)es

Four converging pressures create risk for Tier-1 manufacturers

- Expand compliance: tariffs + geo restrictions + material composition + critical minerals
- Connect to component intelligence sources for automated enrichment and normalization
- Support external validation services and/or Windchill population patterns
- Add risk scoring and dashboards: exposure by program, plant, supplier, and component category

Agenda

01 **Problem Statement**
Supply chain risks at the OEM, supplier, and sourcing levels

02 **Business Metrics**
Industry impact: productivity loss, cost escalation & decision delays

03 **Solution Framework**
Rules-based governance — top-down and bottom-up approach

04 **Case Study: Tier-1 Supplier**
Real-world BOM implementation with Datafrond & PTC Windchill

05 **Key Takeaways**
Summary & call to action

Industry Challenge Check

Four converging pressures create risk for Tier-1 manufacturers

- OEM/customer-specific approved lists and exclusions (AML/AVL) create variant BOM pressure
- Traceability expectations increase under regulated and contract-driven environments (e.g., A&D)
- Manufacturer attributes are often incomplete (origin, materials, technical properties)
- Workarounds persist: spreadsheets, email validation, and tribal knowledge

What We Heard at PTC/User 2026

Four converging pressures create risk for Tier-1 manufacturers

- Applies beyond Automotive/Industrial OEMs — also Aerospace & Defense / prime contracts
- Interest in integrating Industry Component Databases to enrich manufacturer properties (materials, technical attributes, country of origin)
- Questions on whether information is populated into Windchill or validated via an external service
- Compliance scope can extend beyond tariffs/geo restrictions into material composition and critical minerals

SECTION 01

Problem Statement

Supply chain risks at the OEMs, supplier, and sourcing levels

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The Supply Chain Risk Landscape

Four converging pressures create risk for Tier-1 manufacturers

OEM Requirements

- Customer-specific approved manufacturer lists (AML)
- Automotive OEMs for example — each with unique component has rules
- Regional manufacturing compliance (plant-level rules)

Tariff & Trade Policy

- Section 301 / 232 tariffs on Chinese-origin parts
- Unexpected duties from misclassification
- Retaliatory tariffs creating cascading cost impact

Supply Base Complexity

- Many of Manufacturer parts per component
- Manufacturer Part with → multiple regional suppliers
- No structured way to track approved-per-OEM parts

Sourcing Decisions

- Manual, tribal-knowledge-driven processes
- Duplicate part numbers created as workaround
- No single source of truth in PLM or ERP

Current State: How Companies Cope with the Problem Today

Workarounds that create hidden risk and invisible cost

COMMON WORKAROUNDS

- Duplicate part numbers created for every OEM variant
- Spreadsheets to track country-of-origin exclusions
- Manual BOM reviews before each customer quote
- Email chains to validate approved supplier lists
- Inconsistent data between PLM, ERP & Procurement

CONSEQUENCES

- Hundreds of duplicate PNs inflating the PLM database
- Risk of shipping wrong supplier parts to wrong OEM
- Tariff exposure from non-compliant sourcing decisions
- Delays in quoting — days instead of minutes
- Competitive disadvantage at the RFQ stage

SECTION 02

Business Metrics & Industry Impact

Productivity loss, cost escalation & decision delays

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The Cost of Supply Chain Risk

Industry data on what unmanaged supplier risk costs Tier-1 manufacturers (Automotive Industry)

$182B+

Annual global losses

from tariff-related supply chain disruptions

— Gartner, 2024

40%

Of manufacturers

report sourcing decisions delayed ≥2 weeks due to incomplete supplier data

3–5×

Productivity loss

from managing duplicate BOMs vs. a single rule-governed master BOM

67%

Tier-1 automotive suppliers

lack automated OEM-specific BOM filtering capability

$2.5M

Average annual cost

per Tier-1 from tariff non-compliance rework and penalties

18 days

Average resolution time

to fix a supplier-related BOM discrepancy without PLM governance

SECTION 03

Solution: Rules-Based Governance

Top-down and bottom-up supplier governance in Windchill

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Intelligent Supplier Management in Windchill

A system-driven, rule-based framework that ensures accurate supplier selection, enhances traceability, and establishes a single source of truth for BOMs.

1

Rules-Based Governance

Define approved and excluded supplier parts using natural-language business rules. Maintained by the Supply Chain team.

2

Rule Hierarchy

Rules cascade from Site → Program/Project/Product → End Item → Component. OEM rules override at the top; component-specific rules refine at the bottom.

3

BOM Generation

At BOM generation, rules apply at the: End Item first, then global. Ensures flexibility with compliance.

4

Full Traceability

Supplier selections stored at the Program / End Item. Change history and digital thread across PLM, ERP, and MES.

Manufacturer Intelligence (Component Databases)

Four converging pressures create risk for Tier-1 manufacturers

- Common question: integrate Industry Component Databases to enrich manufacturer data
- Enrichment targets: technical properties, material information, supply-base data such as country of origin
- Normalize attributes so rules evaluate consistently across programs, plants, and suppliers

Integration Model: Populate vs Validate

Four converging pressures create risk for Tier-1 manufacturers

- Option A — Populate Windchill: enrich parts/manufacturer parts with validated attributes
- Option B — Validate externally: validate at key events (BOM generation, release gates, sourcing decisions)
- Both models support auditability and scalable compliance enforcement

Rules Governance Architecture — Top-Down

A pyramid of governance: broadest rules at the top, most specific at the base

Rules cascade top-down. More specific rules at lower levels refine global rules.

How Rules Are Applied — BOM Generation

Five automated steps from BOM Generation to audit-ready configuration

1 — BOM Rules Evaluation

Engineer or procurement Navigates to a BOM for a specific End Item + Customer context (e.g., OEM Project XXX, Manufacturing Plant-1)

2 — Component-Level Rules Evaluated

Windchill evaluates Supplier Part attributes (origin, location) against local End Item rules first

3 — Global Rules Applied

System applies Organization level rules for any components not resolved locally

4 — Filtered BOM Generated

Windchill outputs a clean BOM showing only approved Manufacturer Parts for the specific OEM, Product Line and Manufacturing Plant; excluded parts flagged

5 — Integrated to ERP/MES/Supply-Chain

Transfer BOM to downstream ERP/MES Systems with the Applied Rules

SECTION 04

Datafrond Case Study

BOM implementation on PTC Windchill

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The Challenge

Global Tier-1 Automotive Supplier | PTC Windchill PLM

BUSINESS PROBLEM

- Multiple OEM customers (Ford, GM, Stellantis) with different supplier requirements
- One part number → multiple regional Manufacturer Parts below it
- OEMs now requiring OEM-specific supplier parts on their BOMs
- Current workaround: duplicate part numbers per OEM — unsustainable
- No scalable mechanism to exclude Country A origin Manufacturer Parts for Ford projects
- Plant-level rules (Local Manufacturing Site) layered on top of customer rules

SCALE OF THE PROBLEM

- 5–10 Manufacturer Parts per component × hundreds of components
- 4+ major OEM customers with distinct sourcing rules
- 3 regional manufacturing plants with additional constraints
- Duplicate-PN approach would require 500–1,000+ new part numbers
- PLM data integrity at risk from exponential part number growth
- Engineering time lost to manual BOM validation on every quote

The Datafrond Solution

A four-part configuration inside Windchill — no duplicate part numbers, no custom code

1

Enhance existing Windchill AML BOM Report

Displays the applied exclusion rule for the Approved Manufacturer Part(s) per the evaluated Manufacturer Parts (Stored within the Configuration Specification)

2

Rule Definition: IF / THEN Logic

Business rules in natural language:
IF Customer = "OEM-1" THEN exclude Manufacturer Parts with Country of Origin = "Country A"
IF Plant = "Manufacturing Site -1" THEN apply additional Country of Origin filters

3

Rules Storage and Maintenance

Rules creation is limited to a specific role such as OEM Program Manager.
Rules are governed by Windchill Change Management Process.
Rules are defined at various levels with responsibilities:

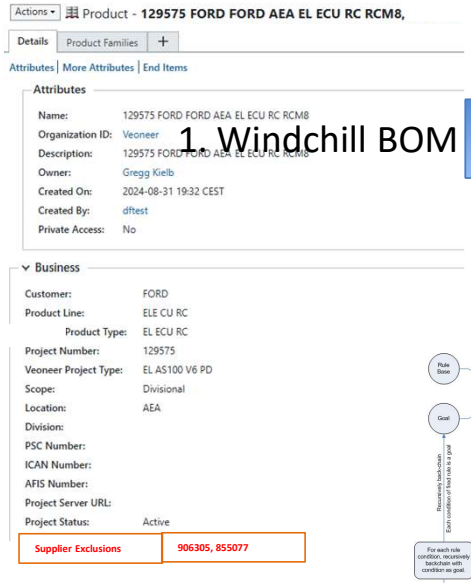
- Component & Manufacturer Part: Component Engineering and Sourcing Managers
- OEM: Customer / Product Line / Manufacturing Plant Rules applied at the Product / Library

4

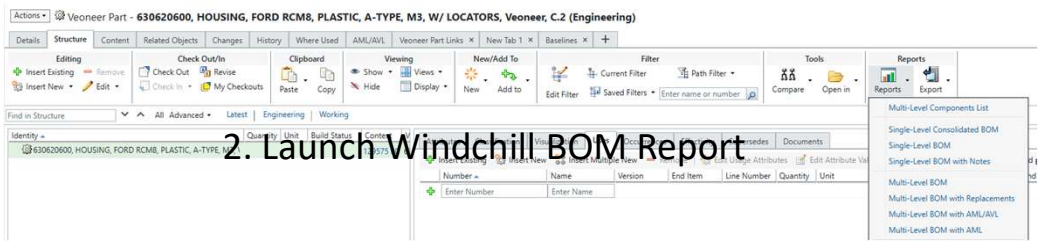
Supplier - AML / AVL Integration

Rules applied at the Supplier Level to evaluate exclusions for Components based on country of origin— supplier governance embedded into the BOM workflow.

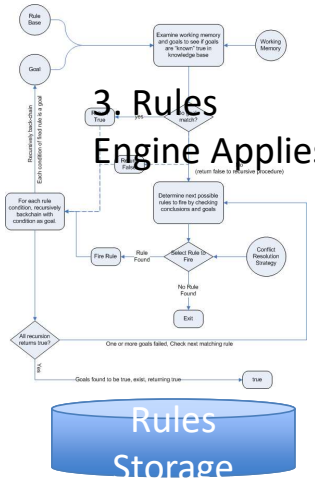
The Datafrond Solution – BOM Reporting + Rules Engine



1. Windchill BOM



2. Launch Windchill BOM Report



3. Rules Engine Applies Rules

4. BOM AML Report Highlights non-Compliant Parts

Business Outcomes

Every element of the framework delivered measurable value

Eliminated

Duplicate PNs

Eliminated 500+ duplicate part numbers. One master structure serves all OEMs.

Same-Day Report

BOM Filtering

Quote BOMs that took 2–3 days to validate manually now generated in minutes.

100%

Rule Traceability

Supplier selections tied to a rule, and approver. Audit-ready.

Automated

OEM Compliance

OEM and plant-level exclusions enforced automatically — Eliminate manual review.

Clean

PLM Data Integrity

Claener Windchill database. No proliferation of customer-variant part numbers.

Scalable

Governance Framework

New OEMs, plants, and tariff rules added without re-engineering the structure.

SECTION 05

Key Takeaways & Call to Action

What to do with what you've heard today

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Key Takeaways

01

Supply Chain Risk Is a PLM Problem

Tariff exposure, OEM compliance, and sourcing decisions are not just procurement challenges — they are product definition challenges that must be governed at the BOM level in your PLM system.

02

Rules-Based Governance Scales Where Spreadsheets Cannot

Windchill's Business Rules Engine encodes complex multi-tiered supplier governance logic that would take thousands of manual steps to replicate. Define once. Enforce everywhere.

03

A Single Source of Truth Protects Revenue

When PLM, procurement, and manufacturing share one governed master BOM, the risk of tariff non-compliance, wrong-supplier shipments, and duplicate data disappears. Veoneer proved it.

04

Start Small — Expand Rapidly

Begin with your highest-risk OEM or highest-tariff component category. The rules framework scales incrementally without disrupting existing processes.

Call to Action

A four-step path from assessment to enterprise-scale supply chain governance

STEP 01

ASSESS

Identify your top 3 supply chain risk exposure areas

STEP 02

ENGAGE

Schedule a Datafrond-led Supply Chain Governance Workshop for your team.

STEP 03

PILOT

Run a rules-based BOM governance pilot on your highest-risk product line.

STEP 04

SCALE

Expand the governance framework to all OEMs, plants, and product families.

VISIT THE DATAFROND BOOTH

datafrond.com · info@datafrond.com · Schedule your complimentary governance workshop

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Thank You

Questions & Discussion

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