Dynamic Industrial CYberrisk Modelling based on Evidence (DICYME)

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Rey Juan Carlos University & DeNexus Inc.

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  - **URJC** & **DeNexus Inc.**
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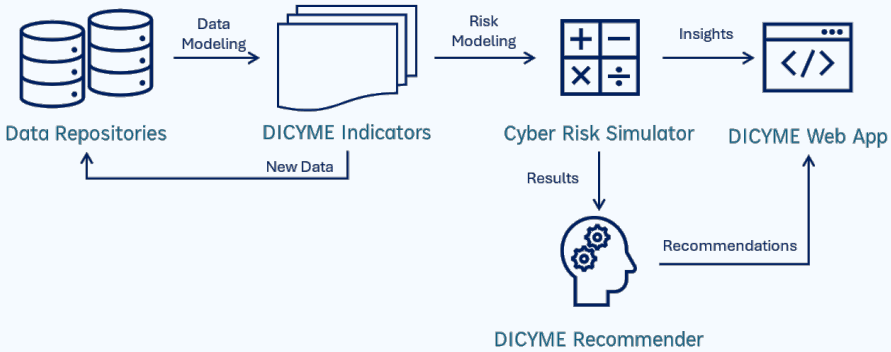
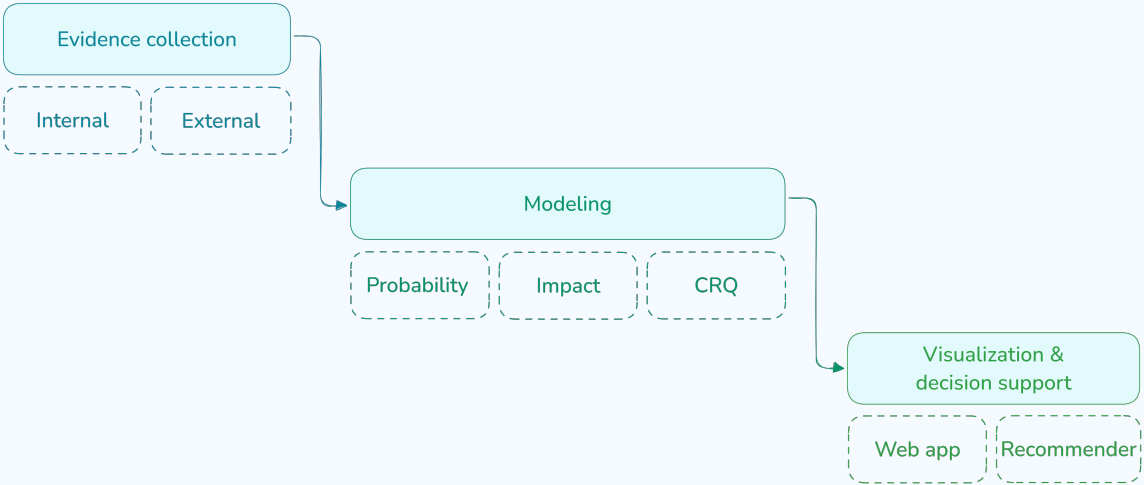
Contenido

- OT systems are vulnerable to cyberattacks.
- Current cybersecurity frameworks (e.g., NIST CSF, NIST SP 800-82, ISO 27019) do not fully address industrial needs.
- DeRISK^{TM} translates OT cyber risk exposures and vulnerabilities into business metrics.
- DICYME proposes a new approach for cyber risk quantification (CRQ).

- Evidence collection → Modeling → Visualization and decision support.
- Uses real and synthetic entities.
- Empowered by LLMs to translate data into actionable knowledge.



2. System workflow



- **Cyber incidents:** multi-source incident data using NLP to remove duplicates and structure information.
- **Victim profile:** entity-level dataset with financials, reputation, and exposure signals for risk modeling (firmographics).
- **IDS telemetry:** anonymized sample of internal security data capturing vulnerabilities, assets, and threat activity.

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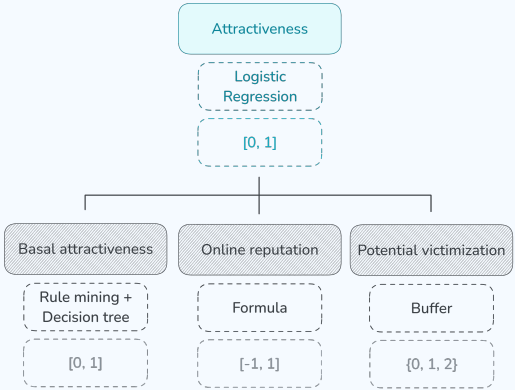
- **Attractiveness:** likelihood of being targeted.
- **THRACT:** threat actor profiling over time.
- **CVE2TTs:** CVE to MITRE ATT&CK mapping.



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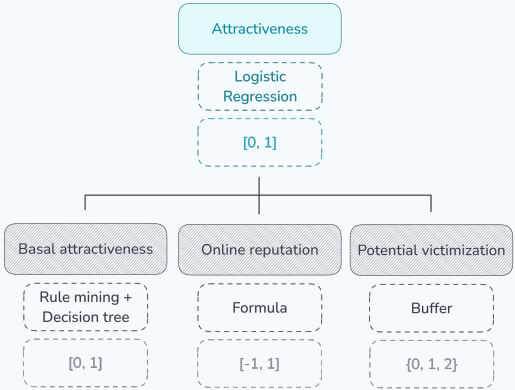

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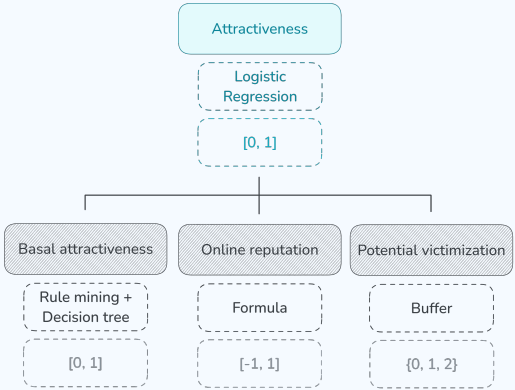
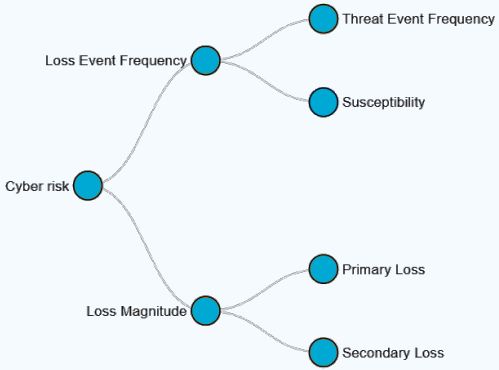


- Based on FAIR taxonomy.
- Combines: frequency × magnitude.
- Uses data and indicators, as well as some inputs.
- Uses Monte Carlo simulations and probabilistic distributions.



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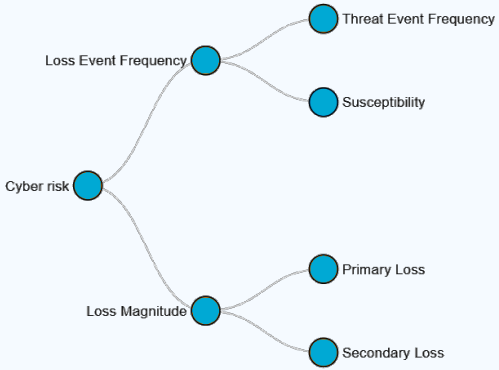

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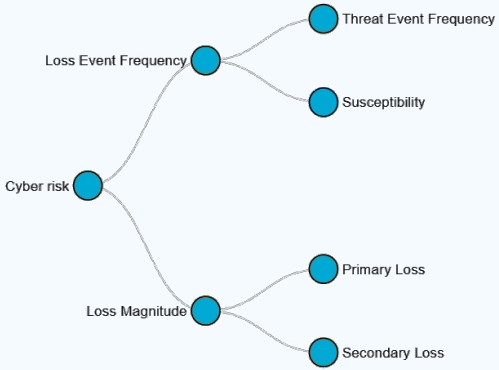

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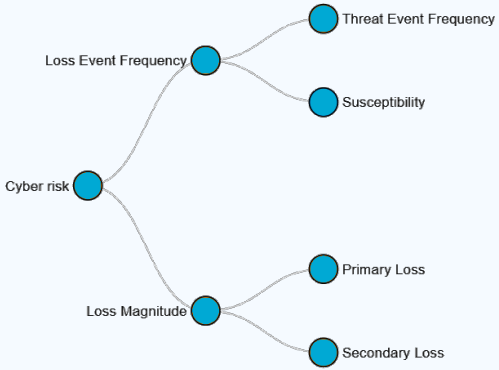

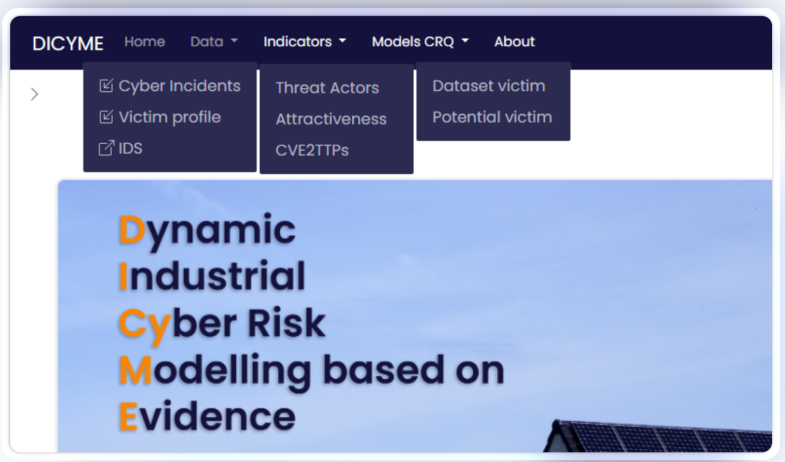
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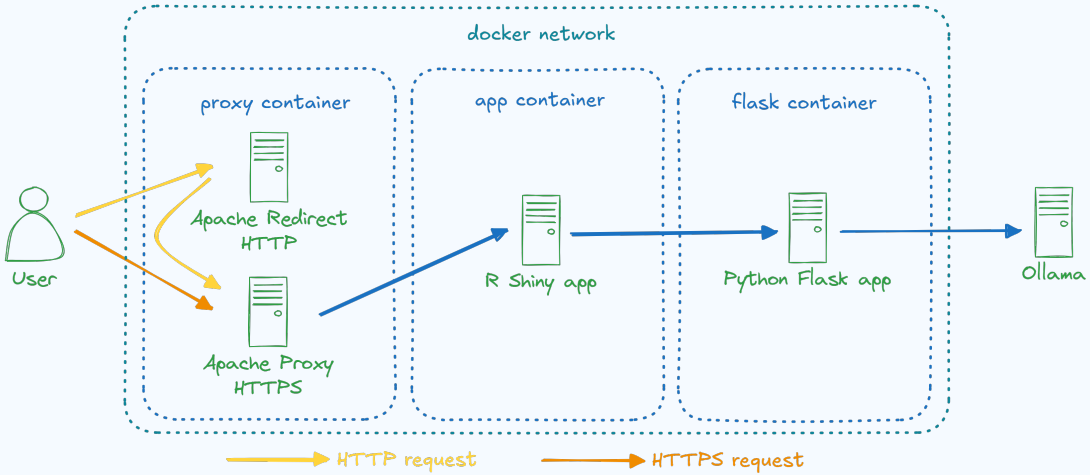
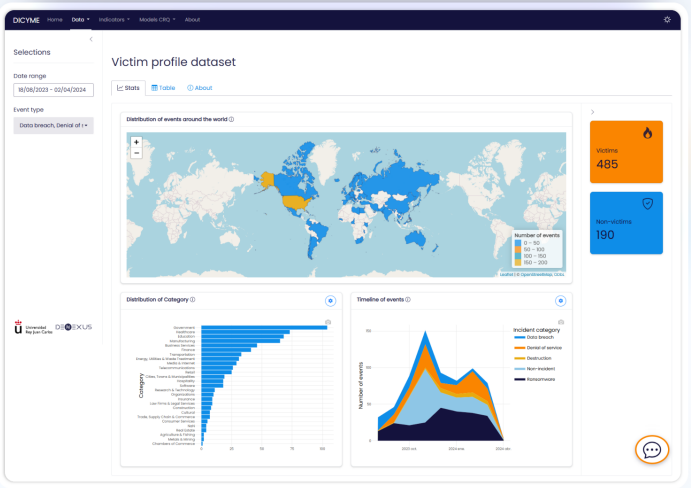

docker network
proxy container
app container
flask container
User
Apache Redirect
HTTP
Apache Proxy
HTTPS
R Shiny app
Python Flask app
Ollama
HTTP request
HTTPS request

4. Visualization & decision support



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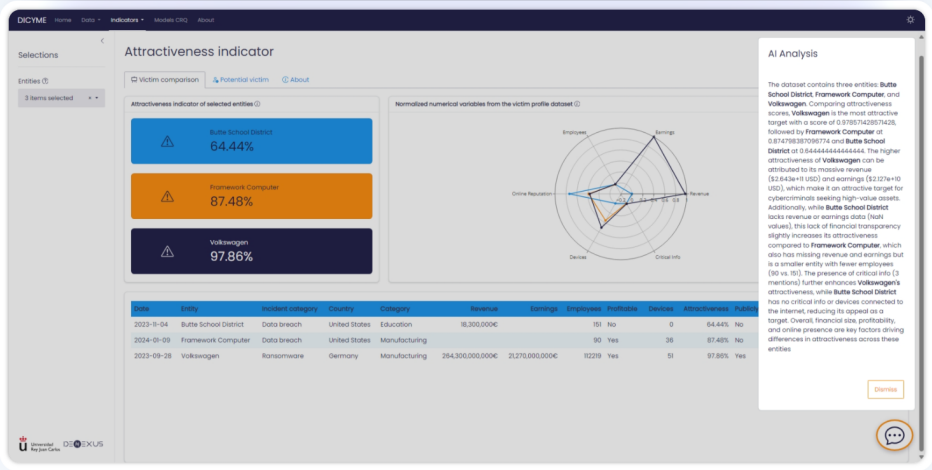

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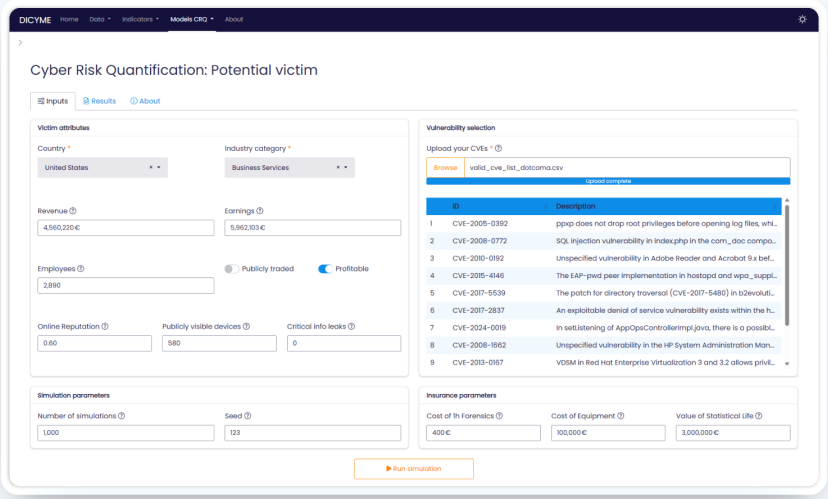

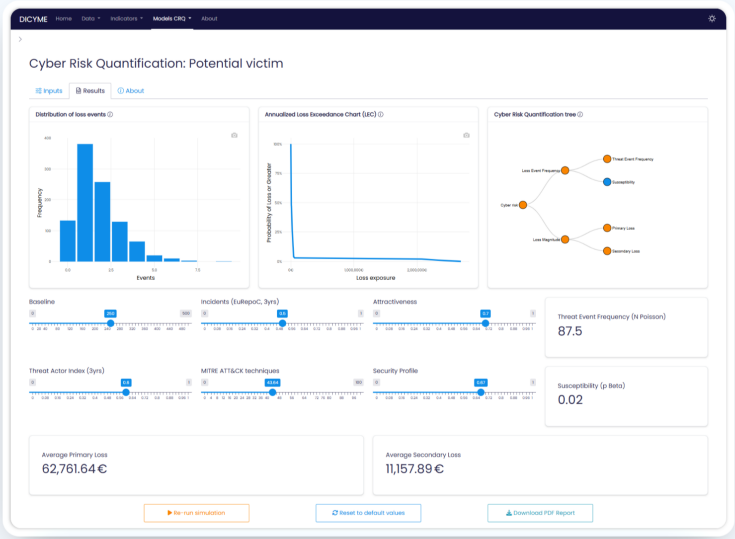
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Threat Event Frequency
Susceptibility
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Loss Magnitude
Primary Loss
Secondary Loss
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Incidents (EuRepoC, 3yrs)
Attractiveness
Threat Event Frequency (N Poisson)
87.5
Threat Actor Index (3yrs)
MITRE ATT&CK techniques
Security Profile
Susceptibility (p Beta)
0.02
Average Primary Loss
62,761.64 €
Average Secondary Loss
11,157.89 €
Re-run simulation
Reset to default values
Download PDF Report

- **Curated datasets:** Aggregated from public, private and telemetry sources to ensure coverage and reliability.
- **Novel indicators:** Metrics such as *Attractiveness*, *THRACT* and *CVE2TTs* provide actionable, data-driven insights.
- **CRQ integration:** Quantification models aligned with FAIR are embedded into a modular platform.
- **Support for insurers:** The system enables more informed underwriting and risk pricing decisions.
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- **AI for data processing:** Use machine learning models to improve data collection, multi-source merging, and missing value imputation.
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Thank you! Any questions?

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MINISTERIO DE CIENCIA, INNOVACIÓN Y UNIVERSIDADES
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