Instituto Politécnico Nacional
Centro de Investigación en Computación
Laboratorio de Ciberseguridad

Sesión 4: Ciberseguridad

Curso : Ciberseguridad
Febrero 16, 2017

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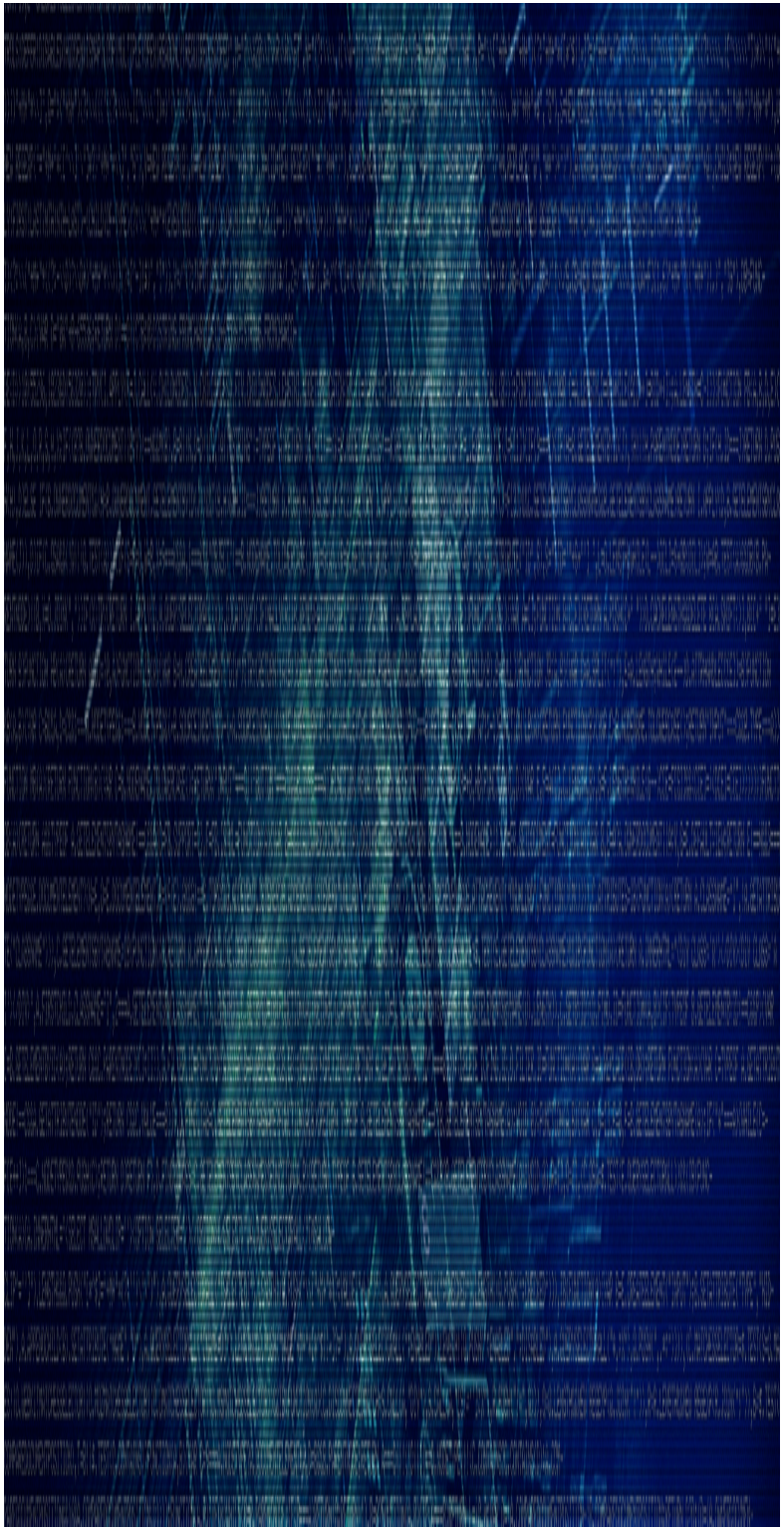

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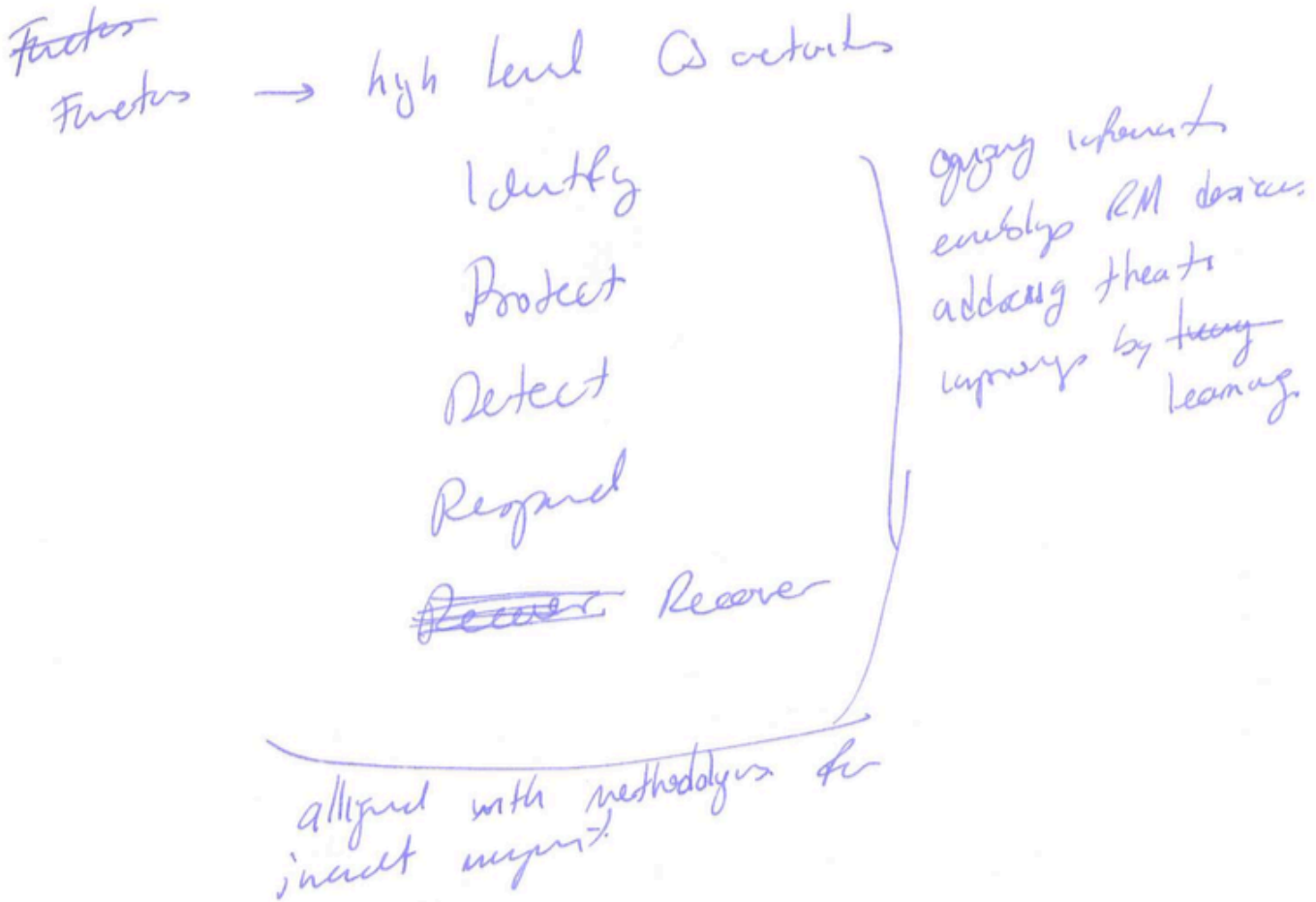
Motivación del Framework



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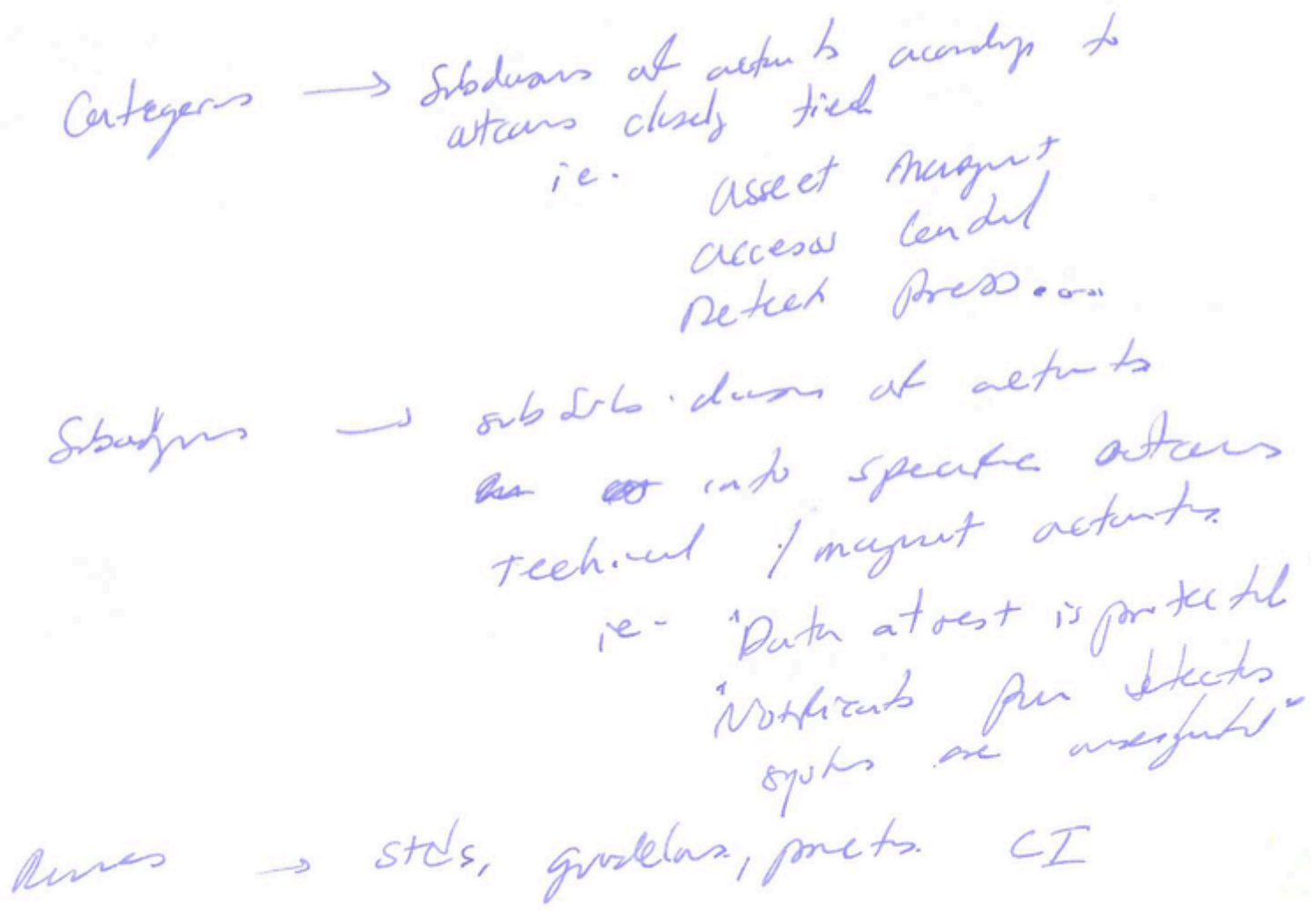

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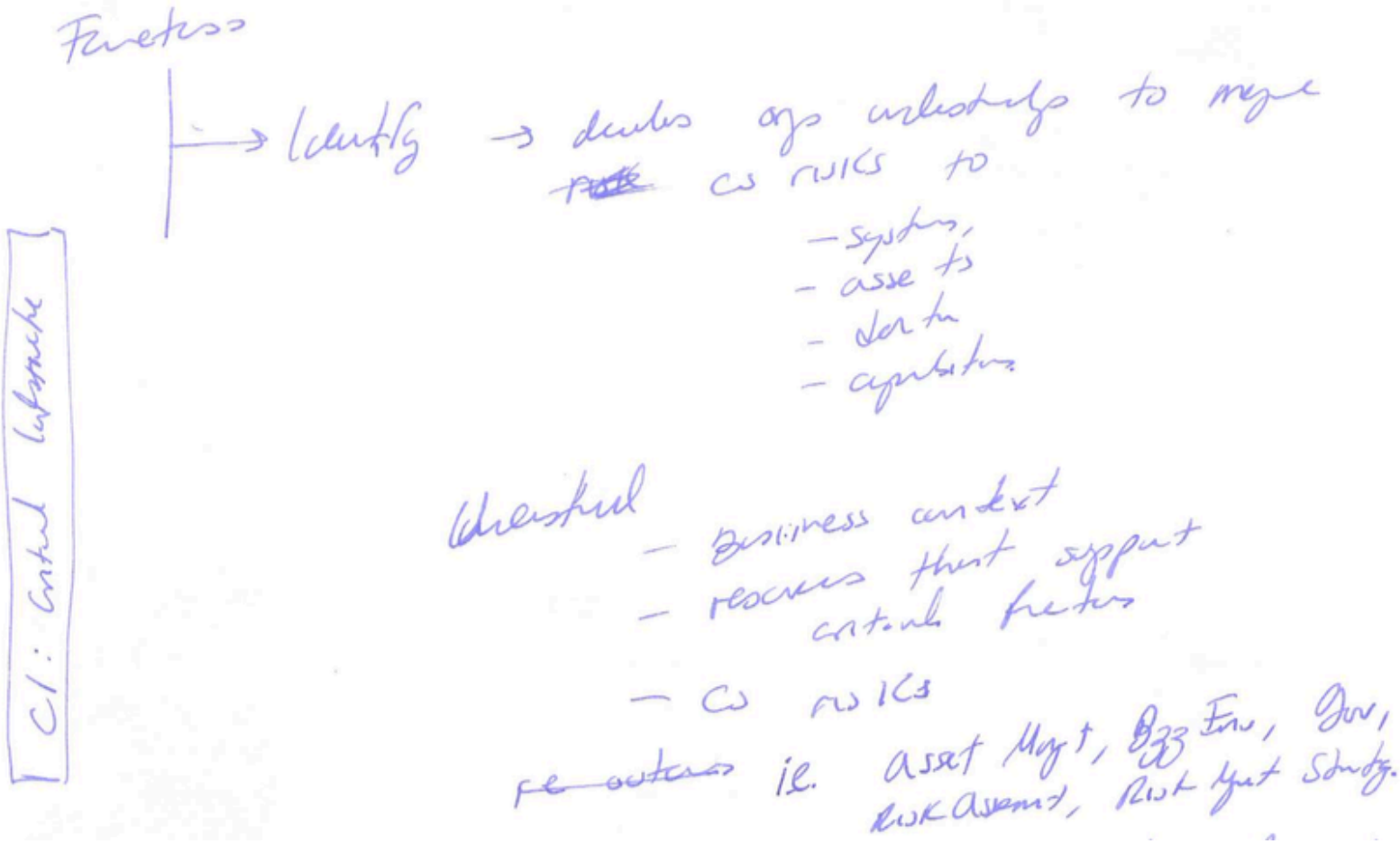

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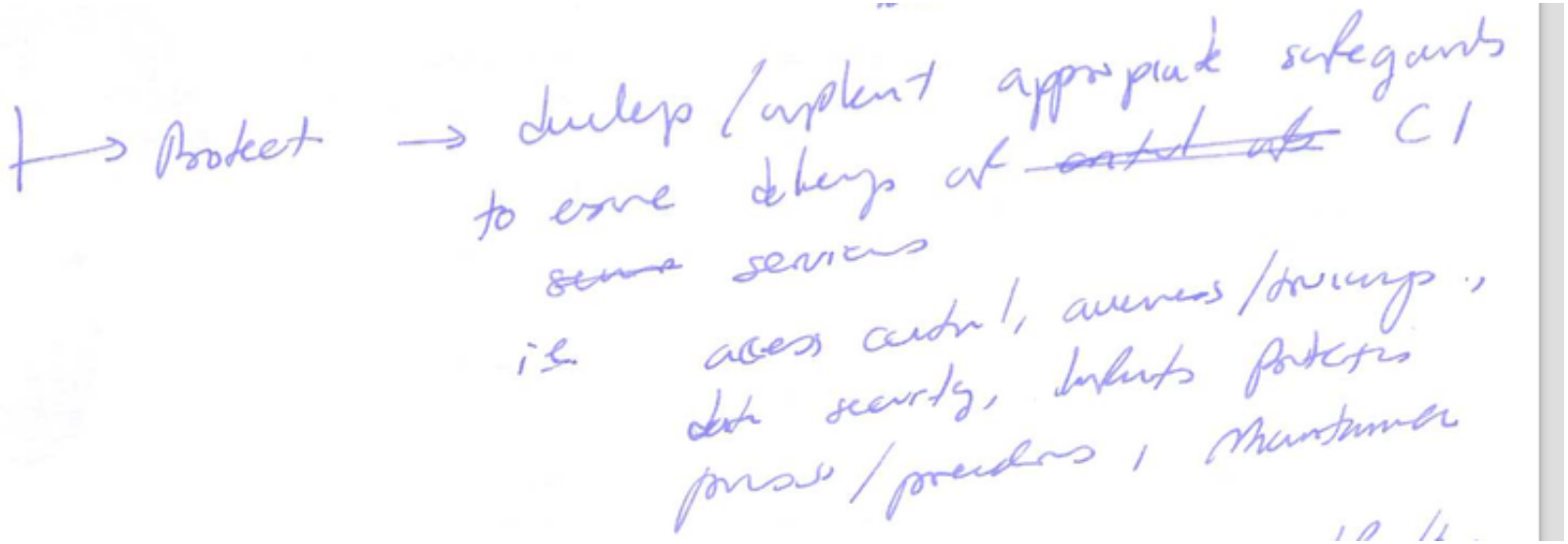

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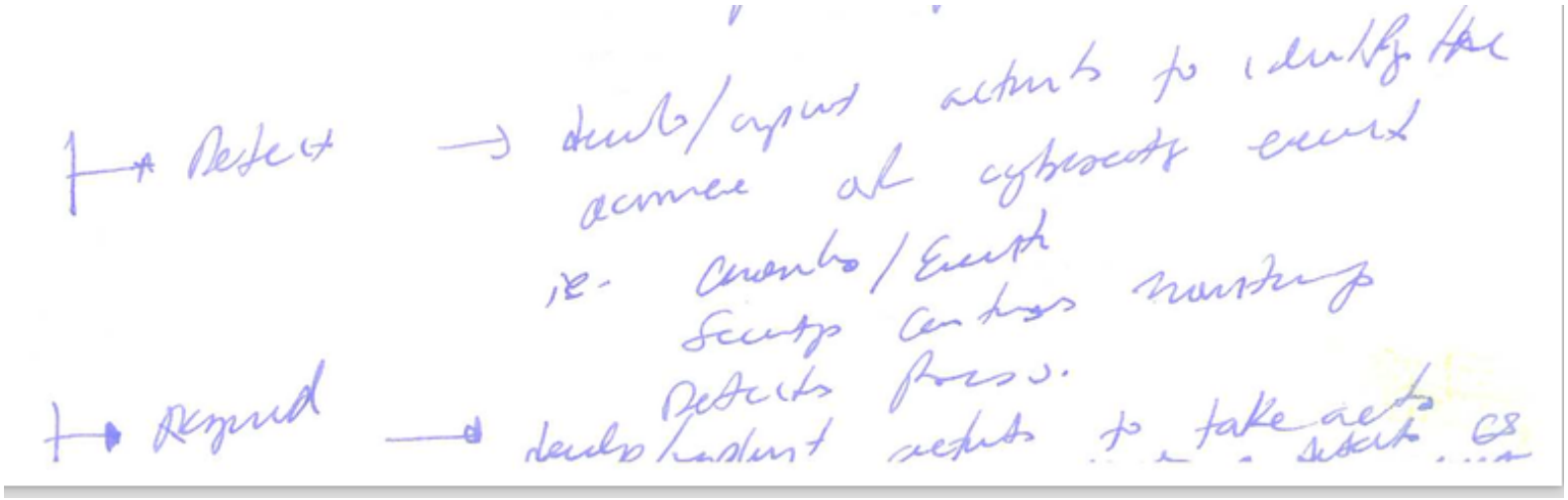

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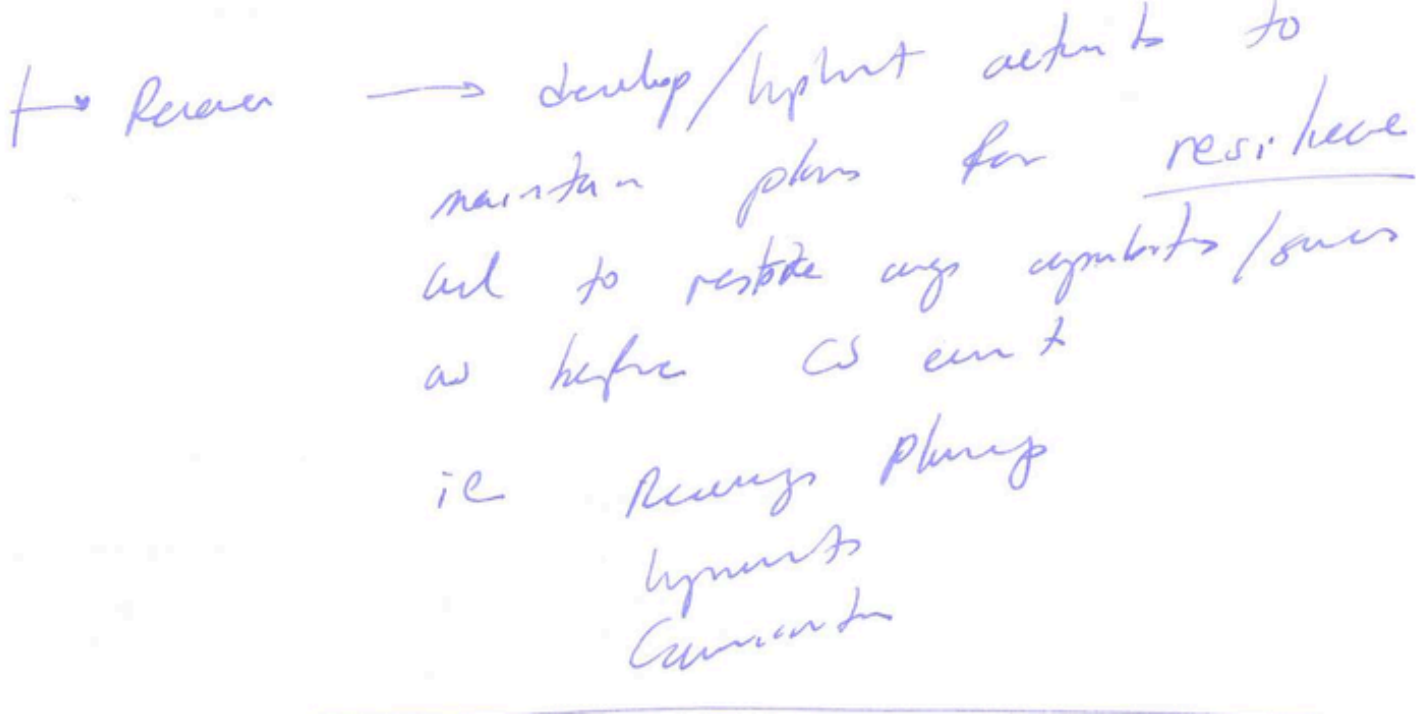

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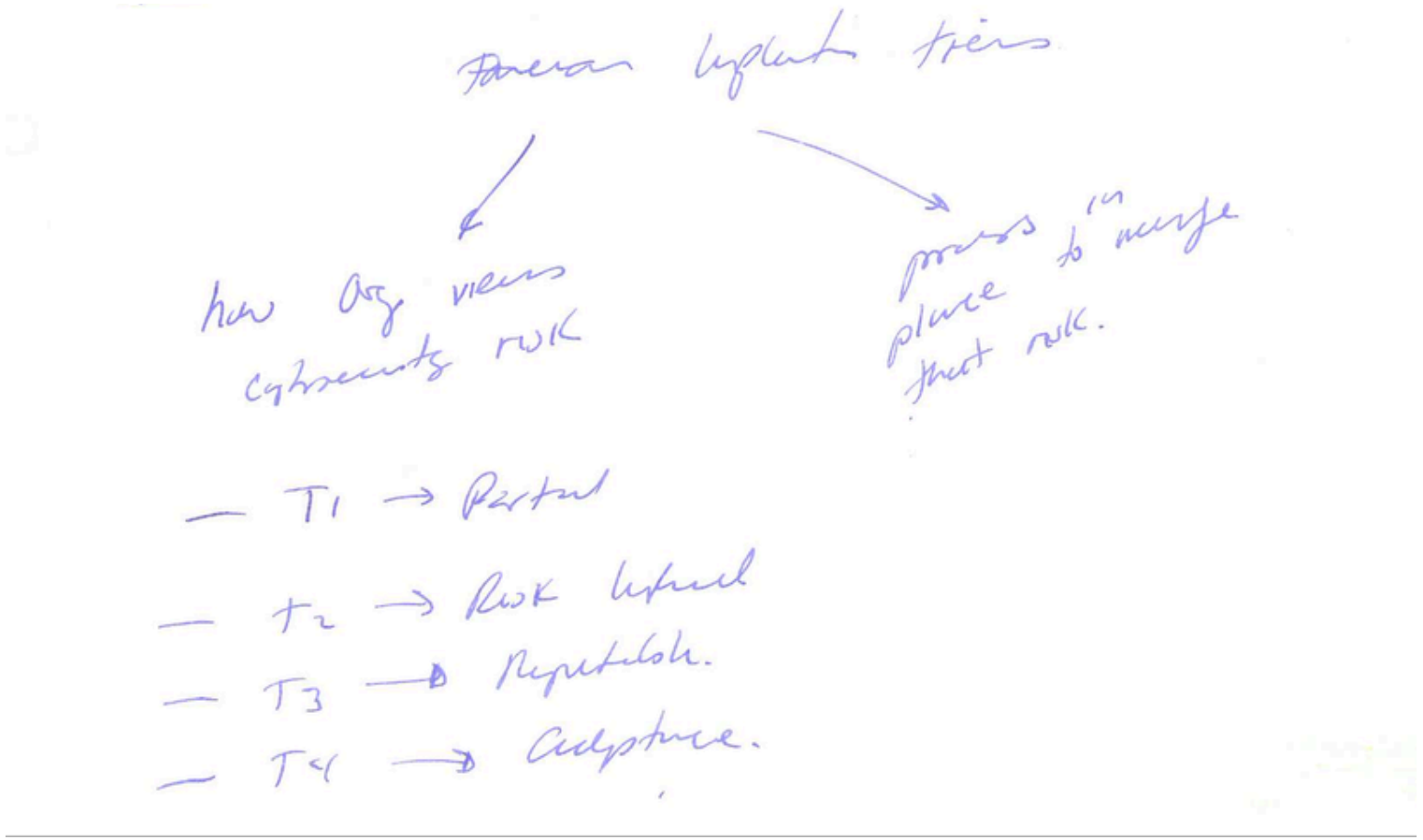

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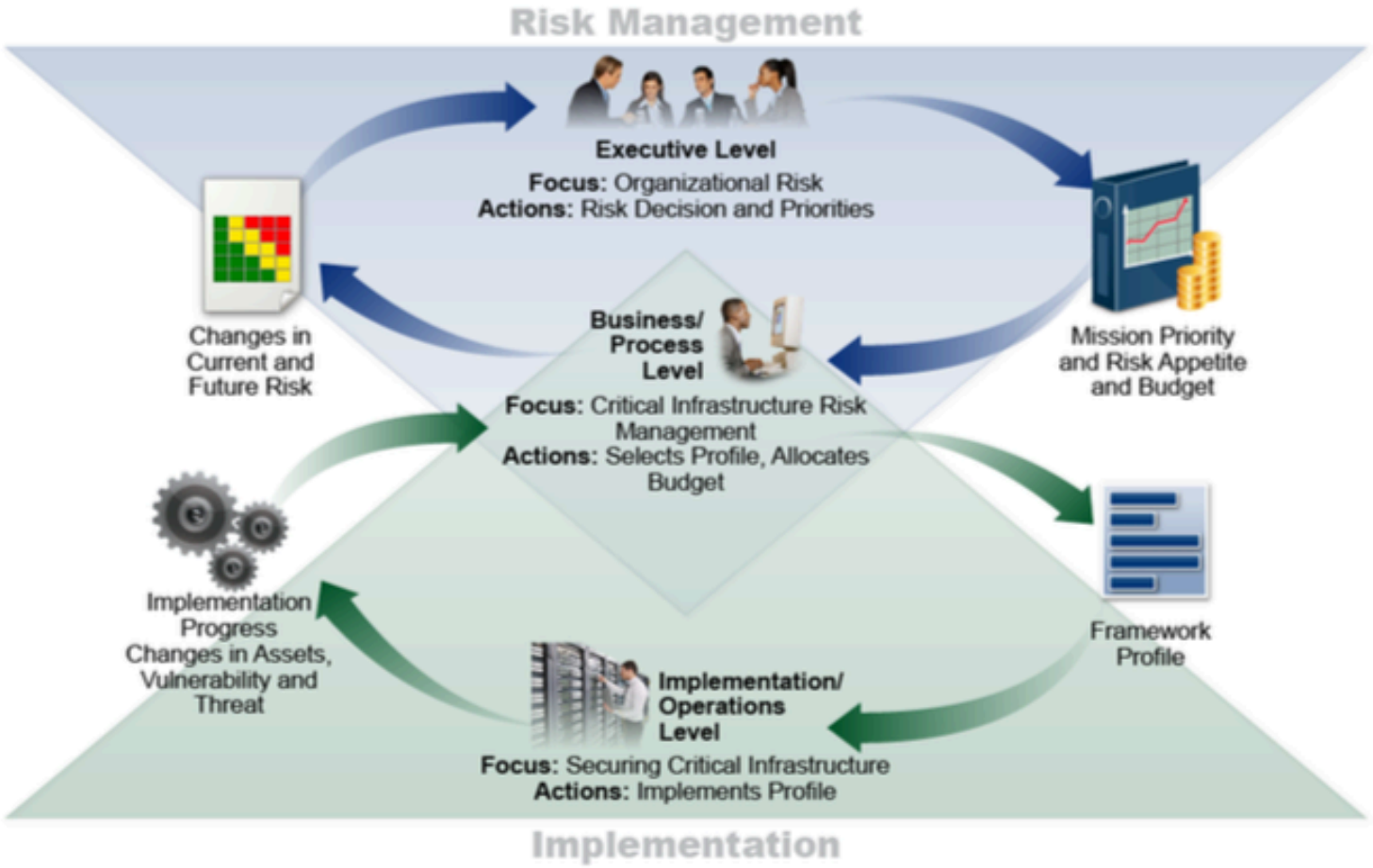

Motivación del Framework

Table 1: Function and Category Unique Identifiers

Function Unique Identifier	Function	Category Unique Identifier	Category
ID	Identify	ID.AM	Asset Management
		ID.BE	Business Environment
		ID.GV	Governance
		ID.RA	Risk Assessment
		ID.RM	Risk Management Strategy
PR	Protect	PR.AC	Access Control
		PR.AT	Awareness and Training
		PR.DS	Data Security
		PR.IP	Information Protection Processes and Procedures
		PR.MA	Maintenance
		PR.PT	Protective Technology
DE	Detect	DE.AE	Anomalies and Events
		DE.CM	Security Continuous Monitoring
		DE.DP	Detection Processes
RS	Respond	RS.RP	Response Planning
		RS.CO	Communications
		RS.AN	Analysis
		RS.MI	Mitigation
		RS.IM	Improvements
RC	Recover	RC.RP	Recovery Planning
		RC.IM	Improvements
		RC.CO	Communications

Motivación del Framework

Table 2: Framework Core

Function	Category	Subcategory	Informative References
IDENTIFY (ID)	**Asset Management (ID.AM):** The data, personnel, devices, systems, and facilities that enable the organization to achieve business purposes are identified and managed consistent with their relative importance to business objectives and the organization's risk strategy.	**ID.AM-1**: Physical devices and systems within the organization are inventoried	• **CCS CSC** 1 • **COBIT 5** BAI09.01, BAI09.02 • **ISA 62443-2-1:2009** 4.2.3.4 • **ISA 62443-3-3:2013** SR 7.8 • **ISO/IEC 27001:2013** A.8.1.1, A.8.1.2 • **NIST SP 800-53 Rev. 4** CM-8
		ID.AM-2: Software platforms and applications within the organization are inventoried	• **CCS CSC** 2 • **COBIT 5** BAI09.01, BAI09.02, BAI09.05 • **ISA 62443-2-1:2009** 4.2.3.4 • **ISA 62443-3-3:2013** SR 7.8 • **ISO/IEC 27001:2013** A.8.1.1, A.8.1.2 • **NIST SP 800-53 Rev. 4** CM-8
		ID.AM-3: Organizational communication and data flows are mapped	• **CCS CSC** 1 • **COBIT 5** DSS05.02 • **ISA 62443-2-1:2009** 4.2.3.4 • **ISO/IEC 27001:2013** A.13.2.1 • **NIST SP 800-53 Rev. 4** AC-4, CA-3, CA-9, PL-8
		ID.AM-4: External information systems are catalogued	• **COBIT 5** APO02.02 • **ISO/IEC 27001:2013** A.11.2.6 • **NIST SP 800-53 Rev. 4** AC-20, SA-9
		ID.AM-5: Resources (e.g., hardware, devices, data, and software) are prioritized based on their classification, criticality, and business value	• **COBIT 5** APO03.03, APO03.04, BAI09.02 • **ISA 62443-2-1:2009** 4.2.3.6 • **ISO/IEC 27001:2013** A.8.2.1 • **NIST SP 800-53 Rev. 4** CP-2, RA-2, SA-14
		ID.AM-6: Cybersecurity roles and responsibilities for the entire workforce and third-party stakeholders (e.g., suppliers, customers, partners) are established	• **COBIT 5** APO01.02, DSS06.03 • **ISA 62443-2-1:2009** 4.3.2.3.3 • **ISO/IEC 27001:2013** A.6.1.1

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Function	Category	Subcategory	Informative References
			• **NIST SP 800-53 Rev. 4** CP-2, PS-7, PM-11
	Business Environment (ID.BE): The organization's mission, objectives, stakeholders, and activities are understood and prioritized; this information is used to inform cybersecurity roles, responsibilities, and risk management decisions.	**ID.BE-1:** The organization's role in the supply chain is identified and communicated	• **COBIT 5** APO08.04, APO08.05, APO10.03, APO10.04, APO10.05 • **ISO/IEC 27001:2013** A.15.1.3, A.15.2.1, A.15.2.2 • **NIST SP 800-53 Rev. 4** CP-2, SA-12
		ID.BE-2: The organization's place in critical infrastructure and its industry sector is identified and communicated	• **COBIT 5** APO02.06, APO03.01 • **NIST SP 800-53 Rev. 4** PM-8
		ID.BE-3: Priorities for organizational mission, objectives, and activities are established and communicated	• **COBIT 5** APO02.01, APO02.06, APO03.01 • **ISA 62443-2-1:2009** 4.2.2.1, 4.2.3.6 • **NIST SP 800-53 Rev. 4** PM-11, SA-14
		ID.BE-4: Dependencies and critical functions for delivery of critical services are established	• **ISO/IEC 27001:2013** A.11.2.2, A.11.2.3, A.12.1.3 • **NIST SP 800-53 Rev. 4** CP-8, PE-9, PE-11, PM-8, SA-14
		ID.BE-5: Resilience requirements to support delivery of critical services are established	• **COBIT 5** DSS04.02 • **ISO/IEC 27001:2013** A.11.1.4, A.17.1.1, A.17.1.2, A.17.2.1 • **NIST SP 800-53 Rev. 4** CP-2, CP-11, SA-14
	Governance (ID.GV): The policies, procedures, and processes to manage and monitor the organization's regulatory, legal, risk, environmental, and operational requirements are understood and inform the management of cybersecurity risk.	**ID.GV-1:** Organizational information security policy is established	• **COBIT 5** APO01.03, EDM01.01, EDM01.02 • **ISA 62443-2-1:2009** 4.3.2.6 • **ISO/IEC 27001:2013** A.5.1.1 • **NIST SP 800-53 Rev. 4** -1 controls from all families
		ID.GV-2: Information security roles & responsibilities are coordinated and aligned with internal roles and external partners	• **COBIT 5** APO13.12 • **ISA 62443-2-1:2009** 4.3.2.3.3 • **ISO/IEC 27001:2013** A.6.1.1, A.7.2.1 • **NIST SP 800-53 Rev. 4** PM-1, PS-7
		ID.GV-3: Legal and regulatory requirements regarding cybersecurity,	• **COBIT 5** MEA03.01, MEA03.04 • **ISA 62443-2-1:2009** 4.4.3.7

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Function	Category	Subcategory	Informative References
		including privacy and civil liberties obligations, are understood and managed	• **ISO/IEC 27001:2013** A.18.1 • **NIST SP 800-53 Rev. 4** -1 controls from all families (except PM-1)
		ID.GV-4: Governance and risk management processes address cybersecurity risks	• **COBIT 5** DSS04.02 • **ISA 62443-2-1:2009** 4.2.3.1, 4.2.3.3, 4.2.3.8, 4.2.3.9, 4.2.3.11, 4.3.2.4.3, 4.3.2.6.3 • **NIST SP 800-53 Rev. 4** PM-9, PM-11
	Risk Assessment (ID.RA): The organization understands the cybersecurity risk to organizational operations (including mission, functions, image, or reputation), organizational assets, and individuals.	**ID.RA-1:** Asset vulnerabilities are identified and documented	• **CCS CSC** 4 • **COBIT 5** APO12.01, APO12.02, APO12.03, APO12.04 • **ISA 62443-2-1:2009** 4.2.3, 4.2.3.7, 4.2.3.9, 4.2.3.12 • **ISO/IEC 27001:2013** A.12.6.1, A.18.2.3 • **NIST SP 800-53 Rev. 4** CA-2, CA-7, CA-8, RA-3, RA-5, SA-5, SA-11, SI-2, SI-4, SI-5
		ID.RA-2: Threat and vulnerability information is received from information sharing forums and sources	• **ISA 62443-2-1:2009** 4.2.3, 4.2.3.9, 4.2.3.12 • **ISO/IEC 27001:2013** A.6.1.4 • **NIST SP 800-53 Rev. 4** PM-15, PM-16, SI-5
		ID.RA-3: Threats, both internal and external, are identified and documented	• **COBIT 5** APO12.01, APO12.02, APO12.03, APO12.04 • **ISA 62443-2-1:2009** 4.2.3, 4.2.3.9, 4.2.3.12 • **NIST SP 800-53 Rev. 4** RA-3, SI-5, PM-12, PM-16
		ID.RA-4: Potential business impacts and likelihoods are identified	• **COBIT 5** DSS04.02 • **ISA 62443-2-1:2009** 4.2.3, 4.2.3.9, 4.2.3.12 • **NIST SP 800-53 Rev. 4** RA-2, RA-3, PM-9, PM-11, SA-14
		ID.RA-5: Threats, vulnerabilities, likelihoods, and impacts are used to determine risk	• **COBIT 5** APO12.02 • **ISO/IEC 27001:2013** A.12.6.1 • **NIST SP 800-53 Rev. 4** RA-2, RA-3, PM-16
		ID.RA-6: Risk responses are identified and	• **COBIT 5** APO12.05, APO13.02

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Function	Category	Subcategory	Informative References
		prioritized	• **NIST SP 800-53 Rev. 4** PM-4, PM-9
	Risk Management Strategy (ID.RM): The organization's priorities, constraints, risk tolerances, and assumptions are established and used to support operational risk decisions.	**ID.RM-1:** Risk management processes are established, managed, and agreed to by organizational stakeholders	• **COBIT 5** APO12.04, APO12.05, APO13.02, BAI02.03, BAI04.02 • **ISA 62443-2-1:2009** 4.3.4.2 • **NIST SP 800-53 Rev. 4** PM-9
		ID.RM-2: Organizational risk tolerance is determined and clearly expressed	• **COBIT 5** APO12.06 • **ISA 62443-2-1:2009** 4.3.2.6.5 • **NIST SP 800-53 Rev. 4** PM-9
		ID.RM-3: The organization's determination of risk tolerance is informed by its role in critical infrastructure and sector specific risk analysis	• **NIST SP 800-53 Rev. 4** PM-8, PM-9, PM-11, SA-14

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Function	Category	Subcategory	Informative References
PROTECT (PR)	**Access Control (PR.AC):** Access to assets and associated facilities is limited to authorized users, processes, or devices, and to authorized activities and transactions.	**PR.AC-1:** Identities and credentials are managed for authorized devices and users	• **CCS CSC** 16 • **COBIT 5** DSS05.04, DSS06.03 • **ISA 62443-2-1:2009** 4.3.3.5.1 • **ISA 62443-3-3:2013** SR 1.1, SR 1.2, SR 1.3, SR 1.4, SR 1.5, SR 1.7, SR 1.8, SR 1.9 • **ISO/IEC 27001:2013** A.9.2.1, A.9.2.2, A.9.2.4, A.9.3.1, A.9.4.2, A.9.4.3 • **NIST SP 800-53 Rev. 4** AC-2, IA Family
		PR.AC-2: Physical access to assets is managed and protected	• **COBIT 5** DSS01.04, DSS05.05 • **ISA 62443-2-1:2009** 4.3.3.3.2, 4.3.3.3.8 • **ISO/IEC 27001:2013** A.11.1.1, A.11.1.2, A.11.1.4, A.11.1.6, A.11.2.3 • **NIST SP 800-53 Rev. 4** PE-2, PE-3, PE-4, PE-5, PE-6, PE-9
		PR.AC-3: Remote access is managed	• **COBIT 5** APO13.01, DSS01.04, DSS05.03 • **ISA 62443-2-1:2009** 4.3.3.6.6 • **ISA 62443-3-3:2013** SR 1.13, SR 2.6 • **ISO/IEC 27001:2013** A.6.2.2, A.13.1.1, A.13.2.1

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Function	Category	Subcategory	Informative References
			• **NIST SP 800-53 Rev. 4** AC-17, AC-19, AC-20
		PR.AC-4: Access permissions are managed, incorporating the principles of least privilege and separation of duties	• **CCS CSC** 12, 15 • **ISA 62443-2-1:2009** 4.3.3.7.3 • **ISA 62443-3-3:2013** SR 2.1 • **ISO/IEC 27001:2013** A.6.1.2, A.9.1.2, A.9.2.3, A.9.4.1, A.9.4.4 • **NIST SP 800-53 Rev. 4** AC-2, AC-3, AC-5, AC-6, AC-16
		PR.AC-5: Network integrity is protected, incorporating network segregation where appropriate	• **ISA 62443-2-1:2009** 4.3.3.4 • **ISA 62443-3-3:2013** SR 3.1, SR 3.8 • **ISO/IEC 27001:2013** A.13.1.1, A.13.1.3, A.13.2.1 • **NIST SP 800-53 Rev. 4** AC-4, SC-7
	Awareness and Training (PR.AT): The organization's personnel and partners are provided cybersecurity awareness education and are adequately trained to perform their information security-related duties and responsibilities consistent with related policies, procedures, and agreements.	**PR.AT-1:** All users are informed and trained	• **CCS CSC** 9 • **COBIT 5** APO07.03, BAI05.07 • **ISA 62443-2-1:2009** 4.3.2.4.2 • **ISO/IEC 27001:2013** A.7.2.2 • **NIST SP 800-53 Rev. 4** AT-2, PM-13
		PR.AT-2: Privileged users understand roles & responsibilities	• **CCS CSC** 9 • **COBIT 5** APO07.02, DSS06.03 • **ISA 62443-2-1:2009** 4.3.2.4.2, 4.3.2.4.3 • **ISO/IEC 27001:2013** A.6.1.1, A.7.2.2 • **NIST SP 800-53 Rev. 4** AT-3, PM-13
		PR.AT-3: Third-party stakeholders (e.g., suppliers, customers, partners) understand roles & responsibilities	• **CCS CSC** 9 • **COBIT 5** APO07.03, APO10.04, APO10.05 • **ISA 62443-2-1:2009** 4.3.2.4.2 • **ISO/IEC 27001:2013** A.6.1.1, A.7.2.2 • **NIST SP 800-53 Rev. 4** PS-7, SA-9
		PR.AT-4: Senior executives understand roles & responsibilities	• **CCS CSC** 9 • **COBIT 5** APO07.03

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Function	Category	Subcategory	Informative References
			• **ISA 62443-2-1:2009** 4.3.2.4.2 • **ISO/IEC 27001:2013** A.6.1.1, A.7.2.2, • **NIST SP 800-53 Rev. 4** AT-3, PM-13
		PR.AT-5: Physical and information security personnel understand roles & responsibilities	• **CCS CSC** 9 • **COBIT 5** APO07.03 • **ISA 62443-2-1:2009** 4.3.2.4.2 • **ISO/IEC 27001:2013** A.6.1.1, A.7.2.2, • **NIST SP 800-53 Rev. 4** AT-3, PM-13
	Data Security (PR.DS): Information and records (data) are managed consistent with the organization's risk strategy to protect the confidentiality, integrity, and availability of information.	**PR.DS-1:** Data-at-rest is protected	• **CCS CSC** 17 • **COBIT 5** APO01.06, BAI02.01, BAI06.01, DSS06.06 • **ISA 62443-3-3:2013** SR 3.4, SR 4.1 • **ISO/IEC 27001:2013** A.8.2.3 • **NIST SP 800-53 Rev. 4** SC-28
		PR.DS-2: Data-in-transit is protected	• **CCS CSC** 17 • **COBIT 5** APO01.06, DSS06.06 • **ISA 62443-3-3:2013** SR 3.1, SR 3.8, SR 4.1, SR 4.2 • **ISO/IEC 27001:2013** A.8.2.3, A.13.1.1, A.13.2.1, A.13.2.3, A.14.1.2, A.14.1.3 • **NIST SP 800-53 Rev. 4** SC-8
		PR.DS-3: Assets are formally managed throughout removal, transfers, and disposition	• **COBIT 5** BAI09.03 • **ISA 62443-2-1:2009** 4. 4.3.3.3.9, 4.3.4.4.1 • **ISA 62443-3-3:2013** SR 4.2 • **ISO/IEC 27001:2013** A.8.2.3, A.8.3.1, A.8.3.2, A.8.3.3, A.11.2.7 • **NIST SP 800-53 Rev. 4** CM-8, MP-6, PE-16
		PR.DS-4: Adequate capacity to ensure availability is maintained	• **COBIT 5** APO13.01 • **ISA 62443-3-3:2013** SR 7.1, SR 7.2 • **ISO/IEC 27001:2013** A.12.3.1

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Function	Category	Subcategory	Informative References
			• **NIST SP 800-53 Rev. 4** AU-4, CP-2, SC-5
		PR.DS-5: Protections against data leaks are implemented	• **CCS CSC** 17 • **COBIT 5** APO01.06 • **ISA 62443-3-3:2013** SR 5.2 • **ISO/IEC 27001:2013** A.6.1.2, A.7.1.1, A.7.1.2, A.7.3.1, A.8.2.2, A.8.2.3, A.9.1.1, A.9.1.2, A.9.2.3, A.9.4.1, A.9.4.4, A.9.4.5, A.13.1.3, A.13.2.1, A.13.2.3, A.13.2.4, A.14.1.2, A.14.1.3 • **NIST SP 800-53 Rev. 4** AC-4, AC-5, AC-6, PE-19, PS-3, PS-6, SC-7, SC-8, SC-13, SC-31, SI-4
		PR.DS-6: Integrity checking mechanisms are used to verify software, firmware, and information integrity	• **ISA 62443-3-3:2013** SR 3.1, SR 3.3, SR 3.4, SR 3.8 • **ISO/IEC 27001:2013** A.12.2.1, A.12.5.1, A.14.1.2, A.14.1.3 • **NIST SP 800-53 Rev. 4** SI-7
		PR.DS-7: The development and testing environment(s) are separate from the production environment	• **COBIT 5** BAI07.04 • **ISO/IEC 27001:2013** A.12.1.4 • **NIST SP 800-53 Rev. 4** CM-2
	Information Protection Processes and Procedures (PR.IP): Security policies (that address purpose, scope, roles, responsibilities, management commitment, and coordination among organizational entities), processes, and procedures are maintained and used to manage protection of information systems and assets.	**PR.IP-1:** A baseline configuration of information technology/industrial control systems is created and maintained	• **CCS CSC** 3, 10 • **COBIT 5** BAI10.01, BAI10.02, BAI10.03, BAI10.05 • **ISA 62443-2-1:2009** 4.3.4.3.2, 4.3.4.3.3 • **ISA 62443-3-3:2013** SR 7.6 • **ISO/IEC 27001:2013** A.12.1.2, A.12.5.1, A.12.6.2, A.14.2.2, A.14.2.3, A.14.2.4 • **NIST SP 800-53 Rev. 4** CM-2, CM-3, CM-4, CM-5, CM-6, CM-7, CM-9, SA-10
		PR.IP-2: A System Development Life Cycle to manage systems is implemented	• **COBIT 5** APO13.01 • **ISA 62443-2-1:2009** 4.3.4.3.3 • **ISO/IEC 27001:2013** A.6.1.5, A.14.1.1, A.14.2.1, A.14.2.5

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Function	Category	Subcategory	Informative References
			• **NIST SP 800-53 Rev. 4** SA-3, SA-4, SA-8, SA-10, SA-11, SA-12, SA-15, SA-17, PL-8
		PR.IP-3: Configuration change control processes are in place	• **COBIT 5** BAI06.01, BAI01.06 • **ISA 62443-2-1:2009** 4.3.4.3.2, 4.3.4.3.3 • **ISA 62443-3-3:2013** SR 7.6 • **ISO/IEC 27001:2013** A.12.1.2, A.12.5.1, A.12.6.2, A.14.2.2, A.14.2.3, A.14.2.4 • **NIST SP 800-53 Rev. 4** CM-3, CM-4, SA-10
		PR.IP-4: Backups of information are conducted, maintained, and tested periodically	• **COBIT 5** APO13.01 • **ISA 62443-2-1:2009** 4.3.4.3.9 • **ISA 62443-3-3:2013** SR 7.3, SR 7.4 • **ISO/IEC 27001:2013** A.12.3.1, A.17.1.2A.17.1.3, A.18.1.3 • **NIST SP 800-53 Rev. 4** CP-4, CP-6, CP-9
		PR.IP-5: Policy and regulations regarding the physical operating environment for organizational assets are met	• **COBIT 5** DSS01.04, DSS05.05 • **ISA 62443-2-1:2009** 4.3.3.3.1 4.3.3.3.2, 4.3.3.3.3, 4.3.3.3.5, 4.3.3.3.6 • **ISO/IEC 27001:2013** A.11.1.4, A.11.2.1, A.11.2.2, A.11.2.3 • **NIST SP 800-53 Rev. 4** PE-10, PE-12, PE-13, PE-14, PE-15, PE-18
		PR.IP-6: Data is destroyed according to policy	• **COBIT 5** BAI09.03 • **ISA 62443-2-1:2009** 4.3.4.4.4 • **ISA 62443-3-3:2013** SR 4.2 • **ISO/IEC 27001:2013** A.8.2.3, A.8.3.1, A.8.3.2, A.11.2.7 • **NIST SP 800-53 Rev. 4** MP-6
		PR.IP-7: Protection processes are continuously improved	• **COBIT 5** APO11.06, DSS04.05 • **ISA 62443-2-1:2009** 4.4.3.1, 4.4.3.2, 4.4.3.3, 4.4.3.4, 4.4.3.5, 4.4.3.6, 4.4.3.7, 4.4.3.8 • **NIST SP 800-53 Rev. 4** CA-2, CA-7, CP-2, IR-

Motivación del Framework

Function	Category	Subcategory	Informative References
			8, PL-2, PM-6
		PR.IP-8: Effectiveness of protection technologies is shared with appropriate parties	• **ISO/IEC 27001:2013** A.16.1.6 • **NIST SP 800-53 Rev. 4** AC-21, CA-7, SI-4
		PR.IP-9: Response plans (Incident Response and Business Continuity) and recovery plans (Incident Recovery and Disaster Recovery) are in place and managed	• **COBIT 5** DSS04.03 • **ISA 62443-2-1:2009** 4.3.2.5.3, 4.3.4.5.1 • **ISO/IEC 27001:2013** A.16.1.1, A.17.1.1, A.17.1.2 • **NIST SP 800-53 Rev. 4** CP-2, IR-8
		PR.IP-10: Response and recovery plans are tested	• **ISA 62443-2-1:2009** 4.3.2.5.7, 4.3.4.5.11 • **ISA 62443-3-3:2013** SR 3.3 • **ISO/IEC 27001:2013** A.17.1.3 • **NIST SP 800-53 Rev.4** CP-4, IR-3, PM-14
		PR.IP-11: Cybersecurity is included in human resources practices (e.g., deprovisioning, personnel screening)	• **COBIT 5** APO07.01, APO07.02, APO07.03, APO07.04, APO07.05 • **ISA 62443-2-1:2009** 4.3.3.2.1, 4.3.3.2.2, 4.3.3.2.3 • **ISO/IEC 27001:2013** A.7.1.1, A.7.3.1, A.8.1.4 • **NIST SP 800-53 Rev. 4** PS Family
		PR.IP-12: A vulnerability management plan is developed and implemented	• **ISO/IEC 27001:2013** A.12.6.1, A.18.2.2 • **NIST SP 800-53 Rev. 4** RA-3, RA-5, SI-2
	Maintenance (PR.MA): Maintenance and repairs of industrial control and information system components is performed consistent with policies and procedures.	**PR.MA-1:** Maintenance and repair of organizational assets is performed and logged in a timely manner, with approved and controlled tools	• **COBIT 5** BAI09.03 • **ISA 62443-2-1:2009** 4.3.3.3.7 • **ISO/IEC 27001:2013** A.11.1.2, A.11.2.4, A.11.2.5 • **NIST SP 800-53 Rev. 4** MA-2, MA-3, MA-5
		PR.MA-2: Remote maintenance of organizational assets is approved, logged, and performed in a manner that prevents unauthorized access	• **COBIT 5** DSS05.04 • **ISA 62443-2-1:2009** 4.3.3.6.5, 4.3.3.6.6, 4.3.3.6.7, 4.4.4.6.8 • **ISO/IEC 27001:2013** A.11.2.4, A.15.1.1, A.15.2.1

Motivación del Framework

Function	Category	Subcategory	Informative References
			• **NIST SP 800-53 Rev. 4** MA-4
	Protective Technology (PR.PT): Technical security solutions are managed to ensure the security and resilience of systems and assets, consistent with related policies, procedures, and agreements.	**PR.PT-1:** Audit/log records are determined, documented, implemented, and reviewed in accordance with policy	• **CCS CSC** 14 • **COBIT 5** APO11.04 • **ISA 62443-2-1:2009** 4.3.3.3.9, 4.3.3.5.8, 4.3.4.4.7, 4.4.2.1, 4.4.2.2, 4.4.2.4 • **ISA 62443-3-3:2013** SR 2.8, SR 2.9, SR 2.10, SR 2.11, SR 2.12 • **ISO/IEC 27001:2013** A.12.4.1, A.12.4.2, A.12.4.3, A.12.4.4, A.12.7.1 • **NIST SP 800-53 Rev. 4** AU Family
		PR.PT-2: Removable media is protected and its use restricted according to policy	• **COBIT 5** DSS05.02, APO13.01 • **ISA 62443-3-3:2013** SR 2.3 • **ISO/IEC 27001:2013** A.8.2.2, A.8.2.3, A.8.3.1, A.8.3.3, A.11.2.9 • **NIST SP 800-53 Rev. 4** MP-2, MP-4, MP-5, MP-7
		PR.PT-3: Access to systems and assets is controlled, incorporating the principle of least functionality	• **COBIT 5** DSS05.02 • **ISA 62443-2-1:2009** 4.3.3.5.1, 4.3.3.5.2, 4.3.3.5.3, 4.3.3.5.4, 4.3.3.5.5, 4.3.3.5.6, 4.3.3.5.7, 4.3.3.5.8, 4.3.3.6.1, 4.3.3.6.2, 4.3.3.6.3, 4.3.3.6.4, 4.3.3.6.5, 4.3.3.6.6, 4.3.3.6.7, 4.3.3.6.8, 4.3.3.6.9, 4.3.3.7.1, 4.3.3.7.2, 4.3.3.7.3, 4.3.3.7.4 • **ISA 62443-3-3:2013** SR 1.1, SR 1.2, SR 1.3, SR 1.4, SR 1.5, SR 1.6, SR 1.7, SR 1.8, SR 1.9, SR 1.10, SR 1.11, SR 1.12, SR 1.13, SR 2.1, SR 2.2, SR 2.3, SR 2.4, SR 2.5, SR 2.6, SR 2.7 • **ISO/IEC 27001:2013** A.9.1.2 • **NIST SP 800-53 Rev. 4** AC-3, CM-7
		PR.PT-4: Communications and control networks are protected	• **CCS CSC** 7 • **COBIT 5** DSS05.02, APO13.01 • **ISA 62443-3-3:2013** SR 3.1, SR 3.5, SR 3.8, SR 4.1, SR 4.3, SR 5.1, SR 5.2, SR 5.3, SR 7.1, SR 7.6 • **ISO/IEC 27001:2013** A.13.1.1, A.13.2.1 • **NIST SP 800-53 Rev. 4** AC-4, AC-17, AC-18, CP-8, SC-7

Motivación del Framework

Function	Category	Subcategory	Informative References
DETECT (DE)	**Anomalies and Events (DE.AE):** Anomalous activity is detected in a timely manner and the potential impact of events is understood.	**DE.AE-1:** A baseline of network operations and expected data flows for users and systems is established and managed	• **COBIT 5** DSS03.01 • **ISA 62443-2-1:2009** 4.4.3.3 • **NIST SP 800-53 Rev. 4** AC-4, CA-3, CM-2, SI-4
		DE.AE-2: Detected events are analyzed to understand attack targets and methods	• **ISA 62443-2-1:2009** 4.3.4.5.6, 4.3.4.5.7, 4.3.4.5.8 • **ISA 62443-3-3:2013** SR 2.8, SR 2.9, SR 2.10, SR 2.11, SR 2.12, SR 3.9, SR 6.1, SR 6.2 • **ISO/IEC 27001:2013** A.16.1.1, A.16.1.4 • **NIST SP 800-53 Rev. 4** AU-6, CA-7, IR-4, SI-4
		DE.AE-3: Event data are aggregated and correlated from multiple sources and sensors	• **ISA 62443-3-3:2013** SR 6.1 • **NIST SP 800-53 Rev. 4** AU-6, CA-7, IR-4, IR-5, IR-8, SI-4
		DE.AE-4: Impact of events is determined	• **COBIT 5** APO12.06 • **NIST SP 800-53 Rev. 4** CP-2, IR-4, RA-3, SI - 4
		DE.AE-5: Incident alert thresholds are established	• **COBIT 5** APO12.06 • **ISA 62443-2-1:2009** 4.2.3.10 • **NIST SP 800-53 Rev. 4** IR-4, IR-5, IR-8
	Security Continuous Monitoring (DE.CM): The information system and assets are monitored at discrete intervals to identify cybersecurity events and verify the effectiveness of protective measures.	**DE.CM-1:** The network is monitored to detect potential cybersecurity events	• **CCS CSC** 14, 16 • **COBIT 5** DSS05.07 • **ISA 62443-3-3:2013** SR 6.2 • **NIST SP 800-53 Rev. 4** AC-2, AU-12, CA-7, CM-3, SC-5, SC-7, SI-4
		DE.CM-2: The physical environment is	• **ISA 62443-2-1:2009** 4.3.3.3.8

Motivación del Framework

Function	Category	Subcategory	Informative References
		monitored to detect potential cybersecurity events	• **NIST SP 800-53 Rev. 4** CA-7, PE-3, PE-6, PE-20
		DE.CM-3: Personnel activity is monitored to detect potential cybersecurity events	• **ISA 62443-3-3:2013** SR 6.2 • **ISO/IEC 27001:2013** A.12.4.1 • **NIST SP 800-53 Rev. 4** AC-2, AU-12, AU-13, CA-7, CM-10, CM-11
		DE.CM-4: Malicious code is detected	• **CCS CSC** 5 • **COBIT 5** DSS05.01 • **ISA 62443-2-1:2009** 4.3.4.3.8 • **ISA 62443-3-3:2013** SR 3.2 • **ISO/IEC 27001:2013** A.12.2.1 • **NIST SP 800-53 Rev. 4** SI-3
		DE.CM-5: Unauthorized mobile code is detected	• **ISA 62443-3-3:2013** SR 2.4 • **ISO/IEC 27001:2013** A.12.5.1 • **NIST SP 800-53 Rev. 4** SC-18, SI-4. SC-44
		DE.CM-6: External service provider activity is monitored to detect potential cybersecurity events	• **COBIT 5** APO07.06 • **ISO/IEC 27001:2013** A.14.2.7, A.15.2.1 • **NIST SP 800-53 Rev. 4** CA-7, PS-7, SA-4, SA-9, SI-4
		DE.CM-7: Monitoring for unauthorized personnel, connections, devices, and software is performed	• **NIST SP 800-53 Rev. 4** AU-12, CA-7, CM-3, CM-8, PE-3, PE-6, PE-20, SI-4
		DE.CM-8: Vulnerability scans are performed	• **COBIT 5** BAI03.10 • **ISA 62443-2-1:2009** 4.2.3.1, 4.2.3.7 • **ISO/IEC 27001:2013** A.12.6.1 • **NIST SP 800-53 Rev. 4** RA-5
	Detection Processes (DE.DP): Detection processes and procedures are maintained and tested to ensure timely and	**DE.DP-1:** Roles and responsibilities for detection are well defined to ensure accountability	• **CCS CSC** 5 • **COBIT 5** DSS05.01 • **ISA 62443-2-1:2009** 4.4.3.1 • **ISO/IEC 27001:2013** A.6.1.1

Motivación del Framework

Function	Category	Subcategory	Informative References
	adequate awareness of anomalous events.		• **NIST SP 800-53 Rev. 4** CA-2, CA-7, PM-14
		DE.DP-2: Detection activities comply with all applicable requirements	• **ISA 62443-2-1:2009** 4.4.3.2 • **ISO/IEC 27001:2013** A.18.1.4 • **NIST SP 800-53 Rev. 4** CA-2, CA-7, PM-14, SI-4
		DE.DP-3: Detection processes are tested	• **COBIT 5** APO13.02 • **ISA 62443-2-1:2009** 4.4.3.2 • **ISA 62443-3-3:2013** SR 3.3 • **ISO/IEC 27001:2013** A.14.2.8 • **NIST SP 800-53 Rev. 4** CA-2, CA-7, PE-3, PM-14, SI-3, SI-4
		DE.DP-4: Event detection information is communicated to appropriate parties	• **COBIT 5** APO12.06 • **ISA 62443-2-1:2009** 4.3.4.5.9 • **ISA 62443-3-3:2013** SR 6.1 • **ISO/IEC 27001:2013** A.16.1.2 • **NIST SP 800-53 Rev. 4** AU-6, CA-2, CA-7, RA-5, SI-4
		DE.DP-5: Detection processes are continuously improved	• **COBIT 5** APO11.06, DSS04.05 • **ISA 62443-2-1:2009** 4.4.3.4 • **ISO/IEC 27001:2013** A.16.1.6 • **NIST SP 800-53 Rev. 4**, CA-2, CA-7, PL-2, RA-5, SI-4, PM-14

Motivación del Framework

Function	Category	Subcategory	Informative References
RESPOND (RS)	**Response Planning (RS.RP):** Response processes and procedures are executed and maintained, to ensure timely response to detected cybersecurity events.	**RS.RP-1:** Response plan is executed during or after an event	• **COBIT 5** BAI01.10 • **CCS CSC** 18 • **ISA 62443-2-1:2009** 4.3.4.5.1 • **ISO/IEC 27001:2013** A.16.1.5 • **NIST SP 800-53 Rev. 4** CP-2, CP-10, IR-4, IR-8
	Communications (RS.CO): Response activities are coordinated with internal and external stakeholders, as appropriate, to include external support from law enforcement agencies.	**RS.CO-1:** Personnel know their roles and order of operations when a response is needed	• **ISA 62443-2-1:2009** 4.3.4.5.2, 4.3.4.5.3, 4.3.4.5.4 • **ISO/IEC 27001:2013** A.6.1.1, A.16.1.1 • **NIST SP 800-53 Rev. 4** CP-2, CP-3, IR-3, IR-8
		RS.CO-2: Events are reported consistent with established criteria	• **ISA 62443-2-1:2009** 4.3.4.5.5 • **ISO/IEC 27001:2013** A.6.1.3, A.16.1.2 • **NIST SP 800-53 Rev. 4** AU-6, IR-6, IR-8
		RS.CO-3: Information is shared consistent with response plans	• **ISA 62443-2-1:2009** 4.3.4.5.2 • **ISO/IEC 27001:2013** A.16.1.2 • **NIST SP 800-53 Rev. 4** CA-2, CA-7, CP-2, IR-4, IR-8, PE-6, RA-5, SI-4
		RS.CO-4: Coordination with stakeholders occurs consistent with response plans	• **ISA 62443-2-1:2009** 4.3.4.5.5 • **NIST SP 800-53 Rev. 4** CP-2, IR-4, IR-8
		RS.CO-5: Voluntary information sharing occurs with external stakeholders to achieve broader cybersecurity situational awareness	• **NIST SP 800-53 Rev. 4** PM-15, SI-5
	Analysis (RS.AN): Analysis is conducted to ensure adequate response and support recovery activities.	**RS.AN-1:** Notifications from detection systems are investigated	• **COBIT 5** DSS02.07 • **ISA 62443-2-1:2009** 4.3.4.5.6, 4.3.4.5.7, 4.3.4.5.8 • **ISA 62443-3-3:2013** SR 6.1 • **ISO/IEC 27001:2013** A.12.4.1, A.12.4.3, A.16.1.5 • **NIST SP 800-53 Rev. 4** AU-6, CA-7, IR-4, IR-

Motivación del Framework

Function	Category	Subcategory	Informative References
			5, PE-6, SI-4
		RS.AN-2: The impact of the incident is understood	• **ISA 62443-2-1:2009** 4.3.4.5.6, 4.3.4.5.7, 4.3.4.5.8 • **ISO/IEC 27001:2013** A.16.1.6 • **NIST SP 800-53 Rev. 4** CP-2, IR-4
		RS.AN-3: Forensics are performed	• **ISA 62443-3-3:2013** SR 2.8, SR 2.9, SR 2.10, SR 2.11, SR 2.12, SR 3.9, SR 6.1 • **ISO/IEC 27001:2013** A.16.1.7 • **NIST SP 800-53 Rev. 4** AU-7, IR-4
		RS.AN-4: Incidents are categorized consistent with response plans	• **ISA 62443-2-1:2009** 4.3.4.5.6 • **ISO/IEC 27001:2013** A.16.1.4 • **NIST SP 800-53 Rev. 4** CP-2, IR-4, IR-5, IR-8
	Mitigation (RS.MI): Activities are performed to prevent expansion of an event, mitigate its effects, and eradicate the incident.	**RS.MI-1:** Incidents are contained	• **ISA 62443-2-1:2009** 4.3.4.5.6 • **ISA 62443-3-3:2013** SR 5.1, SR 5.2, SR 5.4 • **ISO/IEC 27001:2013** A.16.1.5 • **NIST SP 800-53 Rev. 4** IR-4
		RS.MI-2: Incidents are mitigated	• **ISA 62443-2-1:2009** 4.3.4.5.6, 4.3.4.5.10 • **ISO/IEC 27001:2013** A.12.2.1, A.16.1.5 • **NIST SP 800-53 Rev. 4** IR-4
		RS.MI-3: Newly identified vulnerabilities are mitigated or documented as accepted risks	• **ISO/IEC 27001:2013** A.12.6.1 • **NIST SP 800-53 Rev. 4** CA-7, RA-3, RA-5
	Improvements (RS.IM): Organizational response activities are improved by incorporating lessons learned from current and previous detection/response activities.	**RS.IM-1:** Response plans incorporate lessons learned	• **COBIT 5** BAI01.13 • **ISA 62443-2-1:2009** 4.3.4.5.10, 4.4.3.4 • **ISO/IEC 27001:2013** A.16.1.6 • **NIST SP 800-53 Rev. 4** CP-2, IR-4, IR-8
		RS.IM-2: Response strategies are updated	• **NIST SP 800-53 Rev. 4** CP-2, IR-4, IR-8

Motivación del Framework

Function	Category	Subcategory	Informative References
RECOVER (RC)	**Recovery Planning (RC.RP):** Recovery processes and procedures are executed and maintained to ensure timely restoration of systems or assets affected by cybersecurity events.	**RC.RP-1:** Recovery plan is executed during or after an event	• **CCS CSC** 8 • **COBIT 5** DSS02.05, DSS03.04 • **ISO/IEC 27001:2013** A.16.1.5 • **NIST SP 800-53 Rev. 4** CP-10, IR-4, IR-8
	Improvements (RC.IM): Recovery planning and processes are improved by incorporating lessons learned into future activities.	**RC.IM-1:** Recovery plans incorporate lessons learned	• **COBIT 5** BAI05.07 • **ISA 62443-2-1:2009** 4.4.3.4 • **NIST SP 800-53 Rev. 4** CP-2, IR-4, IR-8
		RC.IM-2: Recovery strategies are updated	• **COBIT 5** BAI07.08 • **NIST SP 800-53 Rev. 4** CP-2, IR-4, IR-8
	Communications (RC.CO): Restoration activities are coordinated with internal and external parties, such as coordinating centers, Internet Service Providers, owners of attacking systems, victims, other CSIRTs, and vendors.	**RC.CO-1:** Public relations are managed	• **COBIT 5** EDM03.02
		RC.CO-2: Reputation after an event is repaired	• **COBIT 5** MEA03.02
		RC.CO-3: Recovery activities are communicated to internal stakeholders and executive and management teams	• **NIST SP 800-53 Rev. 4** CP-2, IR-4

Motivación del Framework

CCS	Council on CyberSecurity
COBIT	Control Objectives for Information and Related Technology
DCS	Distributed Control System
DHS	Department of Homeland Security
EO	Executive Order
ICS	Industrial Control Systems
IEC	International Electrotechnical Commission
IR	Interagency Report
ISA	International Society of Automation
ISAC	Information Sharing and Analysis Center
ISO	International Organization for Standardization
IT	Information Technology
NIST	National Institute of Standards and Technology
RFI	Request for Information
RMP	Risk Management Process
SCADA	Supervisory Control and Data Acquisition
SP	Special Publication

ISO 27000

1. El estándar ISO27001:2005 SGSI
2. El estándar ISO27002:2005 Técnicas de Seguridad
3. Controles de Seguridad
4. Controles Normativos
5. Controles Tecnológicos
6. Ejemplo de un marco de controles
7. Adopción del ISO27001 en la industria
8. Otros marcos de control similares al SGSI

Origen de la ISO 27000

- El problema de la seguridad de la información
  - Información:
    - Principal activo de las organziaciones
    - Existente en diversas representaciones:
      - Archivos electrónicos
      - Bases de datos
      - Comunicaciones electrónicas (tráfico de datos)
      - Conversaciones (voz en teléfono, en persona)
      - Documentos en papel
      - Multimedia: Imágenes, Video
      - Procedimietos, Políticas, Know-how
    - Cada naturaleza requiere una estrategia propia para proteger la información

El problema de la seguridad de la información

- La construcción de una estrategia general para una organización es una tarea de alta complejidad, lo que ha dado paso al desarrollo y adopción de esquemas de mejores prácticas, normas e incluso estándares:

NIST

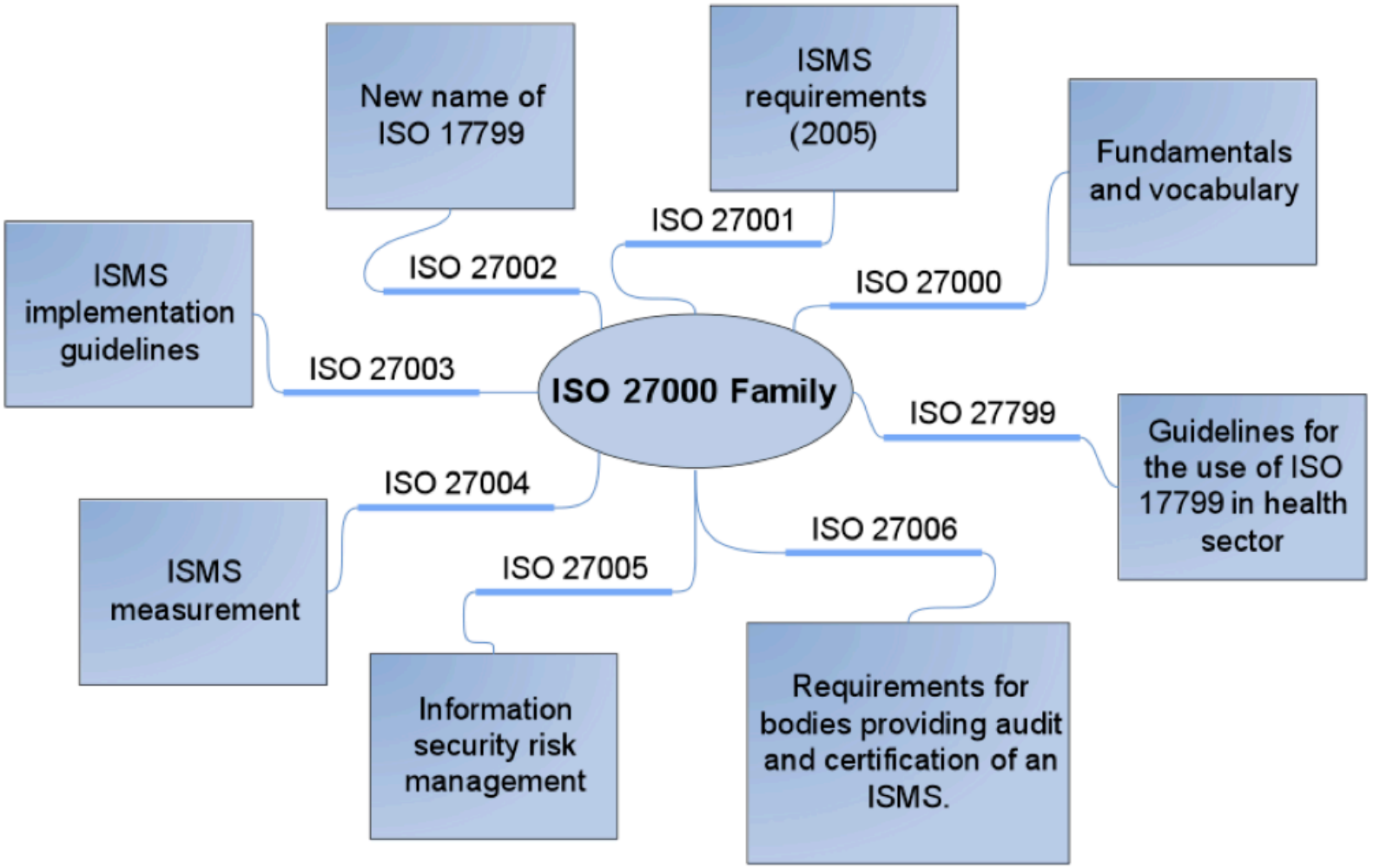
COBIT
GOVERNANCE, CONTROL and ASSURANCE for INFORMATION and RELATED TECHNOLOGY

MAAGTIC-SI

El Marco de la ISO 27000

- Sus origenes de la ISO 27000 parte de los trabajo de la BSI
  - BSI 7799
  - BSI 17799
- El estándar ISO 17799 surge en el 2000 al retomar la ISO los contenidos d ela norma BSI 17799, la cual se describe la puesta en operación de los principales control para la seguridad de la información
- Posteriormente se expiden dos nuevas normar en el marco del 27K en el 2007
  - ISO 27001 <- SGSI
  - ISO 27002 <- Reexpedición de la 17799

La familia de la ISO 27000



Marco de la ISO 27000

- Publicados:
  - ISO/IEC 27000 — Information security management systems — Overview and vocabulary [1]
  - ISO/IEC 27001 — Information security management systems — Requirements
  - ISO/IEC 27002 — Code of practice for information security management
  - ISO/IEC 27003 — Information security management system implementation guidance
  - ISO/IEC 27004 — Information security management — Measurement
  - ISO/IEC 27005 — Information security risk management
  - ISO/IEC 27006 — Requirements for bodies providing audit and certification of information security management systems
  - ISO/IEC 27007 — Guidelines for information security management systems auditing (focused on the management system)
  - ISO/IEC TR 27008 — Guidance for auditors on ISMS controls (focused on the information security controls)
  - ISO/IEC 27010 — Information technology—Security techniques—Information security management for inter-sector and inter-organizational communications

Marco de la ISO 27000

- Publicados:
  - ISO/IEC 27011 — Information security management guidelines for telecommunications organizations based on ISO/IEC 27002
  - ISO/IEC 27013 — Guideline on the integrated implementation of ISO/IEC 20000-1 and ISO/IEC 27001
  - ISO/IEC TR 27015 — Information security management guidelines for financial services
  - ISO/IEC 27031 — Guidelines for information and communications technology readiness for business continuity
  - ISO/IEC 27032 — Guideline for cybersecurity (essentially, 'being a good neighbor' on the Internet)
  - ISO/IEC 27033-1 — Network security overview and concepts
  - ISO/IEC 27033-2 — Guidelines for the design and implementation of network security

Marco de la ISO 27000

- Publicados:
  - ISO/IEC 27033-3:2010 — Reference networking scenarios - Threats, design techniques and control issues
  - ISO/IEC 27034 — Guideline for application security
  - ISO/IEC 27035 — Security incident management
  - ISO/IEC 27037 — Guidelines for identification, collection and/or acquisition and preservation of digital evidence
  - ISO 27799 — Information security management in health using ISO/IEC 27002

Marco de la ISO 27000

- En preparación:
  - ISO/IEC 27036 — Guidelines for security in supplier relationships
  - ISO/IEC 27038 — Specification for redaction of digital documents
  - ISO/IEC 27039 — Intrusion detection and protection systems
  - ISO/IEC 27040 — Guideline on storage security
  - ISO/IEC 27041 — Assurance for digital evidence investigation methods
  - ISO/IEC 27042 — Analysis and interpretation of digital evidence
  - ISO/IEC 27043 — Digital evidence investigation principles and processes

El estándar ISO27001:2005 SGSI

- El estandar fue promovido y formalizado en 2005 por la ISO, es evolución del BSI 7799.
- Provee un modelo para
  - el establecimiento,
  - implementación, operación,
  - monitoreo,
  - revisión,
  - mantenmiento
  - mejora

SGSI

ISO27001:2005 SGSI

- Se basa en un modelo de procesos, lo que ubica a la mejora continua

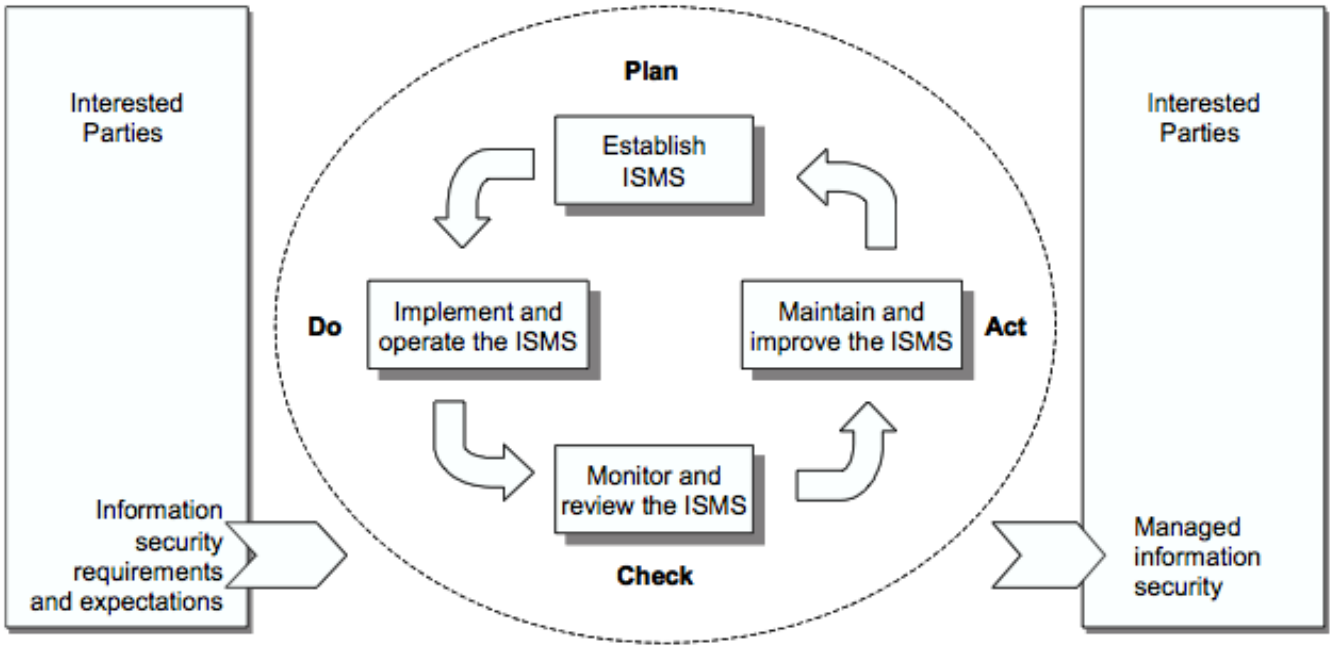


Figure 1 — PDCA model applied to ISMS processes

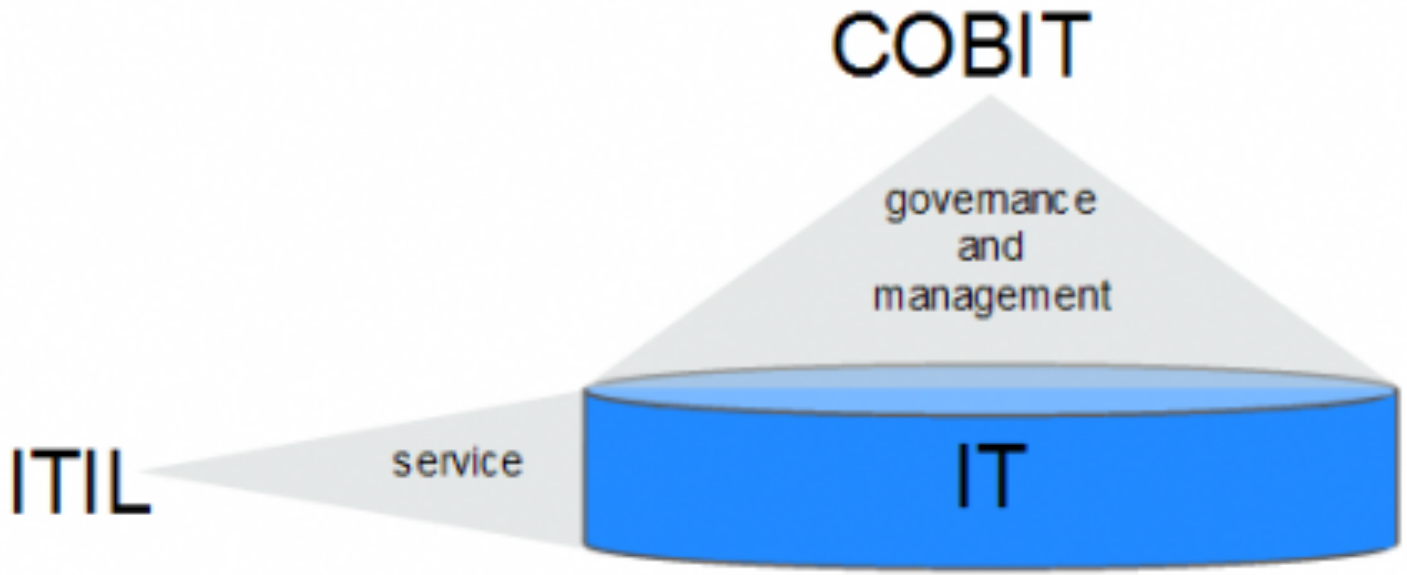
ISO 27001

- Definición de Requisitos para un SGSI:
  - Establecimiento, implementación, operación, mantenimiento y mejora de un SGSI (ISMS)
  - Documentación de Requisitos
  - Administración de responsabilidades
  - Auditoria Interna y revisiones adminisrativas

- Principales características:
  - Propone la adopción de un enfoque de procesos para diseñar, implementar, evaluar y mantener el SGSI

Gobierno de TICs

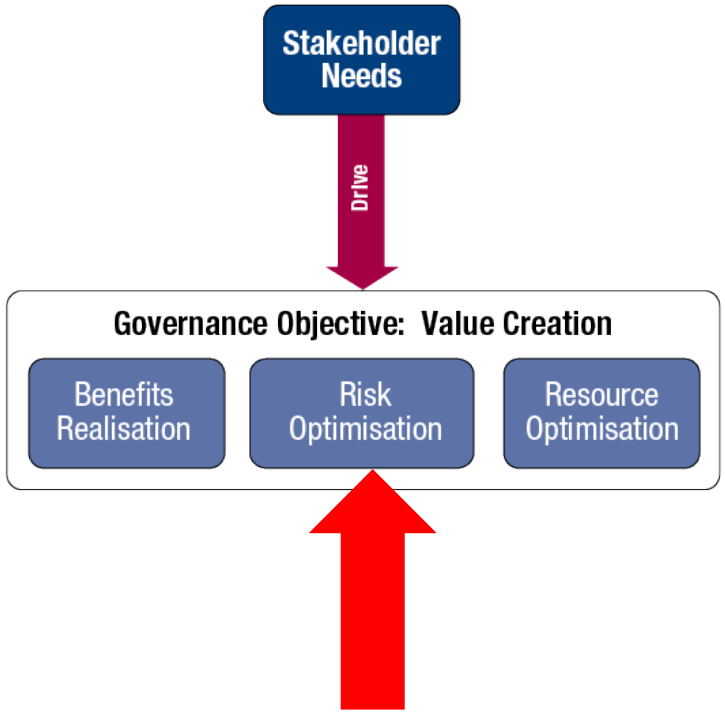
Enfoque de COBIT



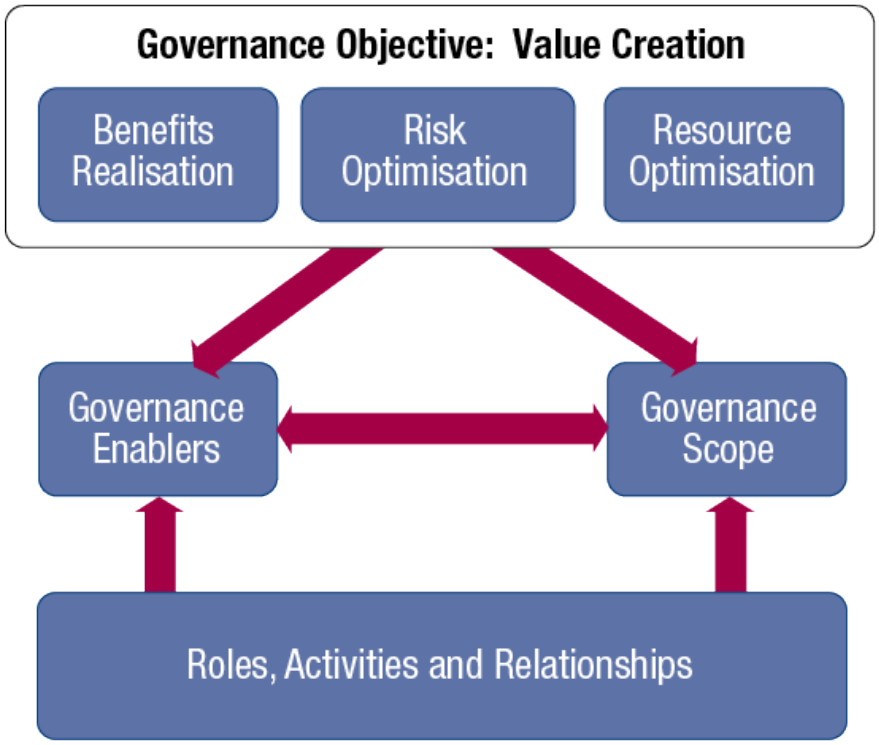
Gobierno Corporativo

- La ISACA define el Gobierno corporativo se define como el comportamiento ético de la organización a través de sus directores y aquellos con responsabilidad de la creación y reporte de valor para los organización y sus interesados. [CISA08]

- La OCDE define el Gobierno corporativo cpmo: "Procedures and processes according to which an organisation is directed and controlled. The corporate governance structure specifies the distribution of rights and responsibilities among the different participants in the organisation – such as the board, managers, shareholders and other stakeholders – and lays down the rules and procedures for decision-making." [OECD05]



La función de Gobierno de ICT



El gobierno ICT promueve el alineamiento de ICT al gobierno corporativo

Claves para el gobierno de ICT

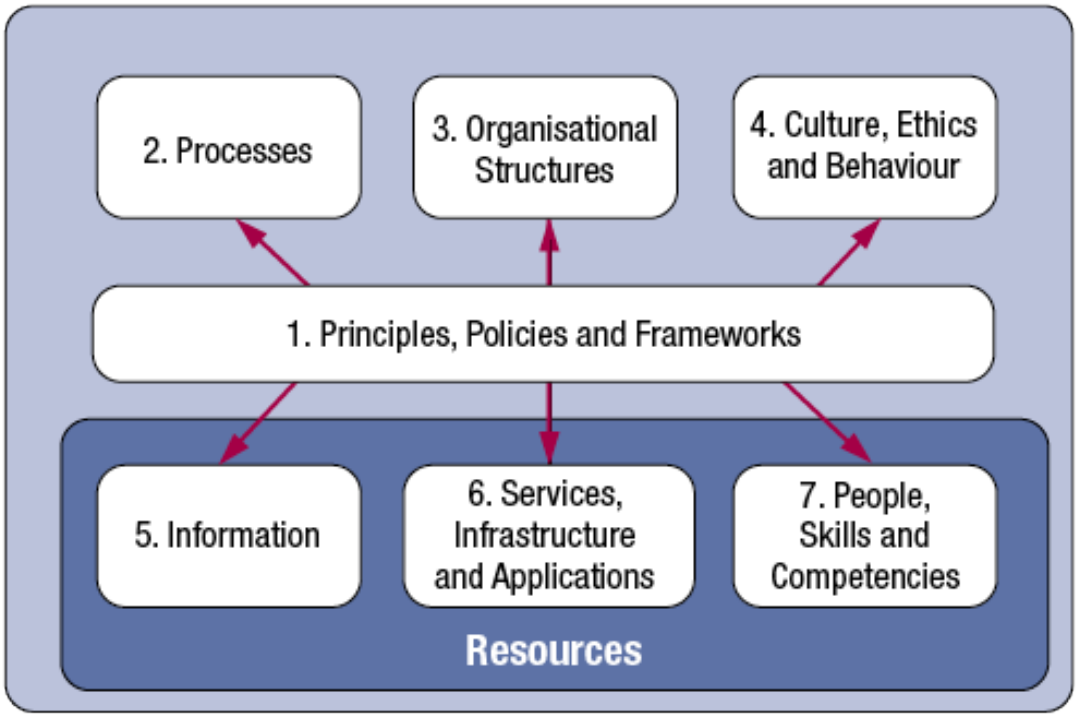
- La entrega de valor
- Gestión de Riesgos

Involucra:

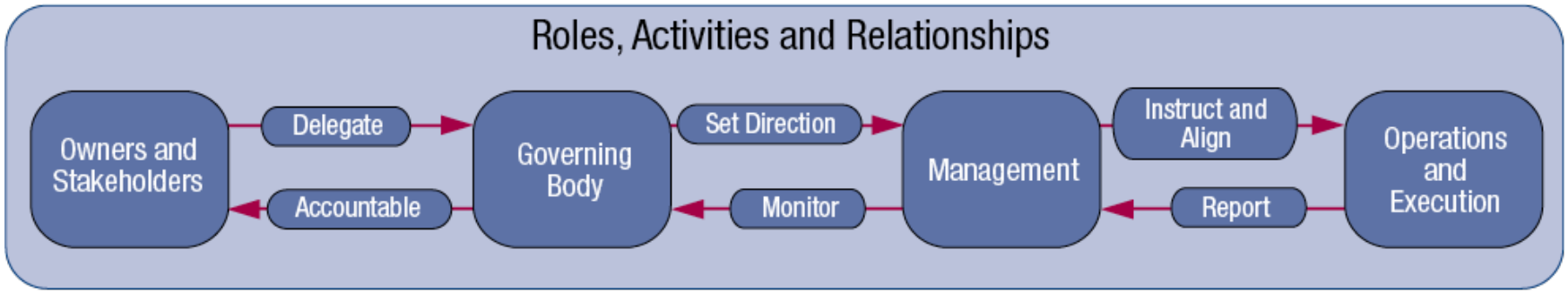
- Sistemas de información, telecomunicaciones, legal, negocio, etc.
- Mejores prácticas, monitoreo, control interno, etc.

Habilitadores del Gobierno ICT

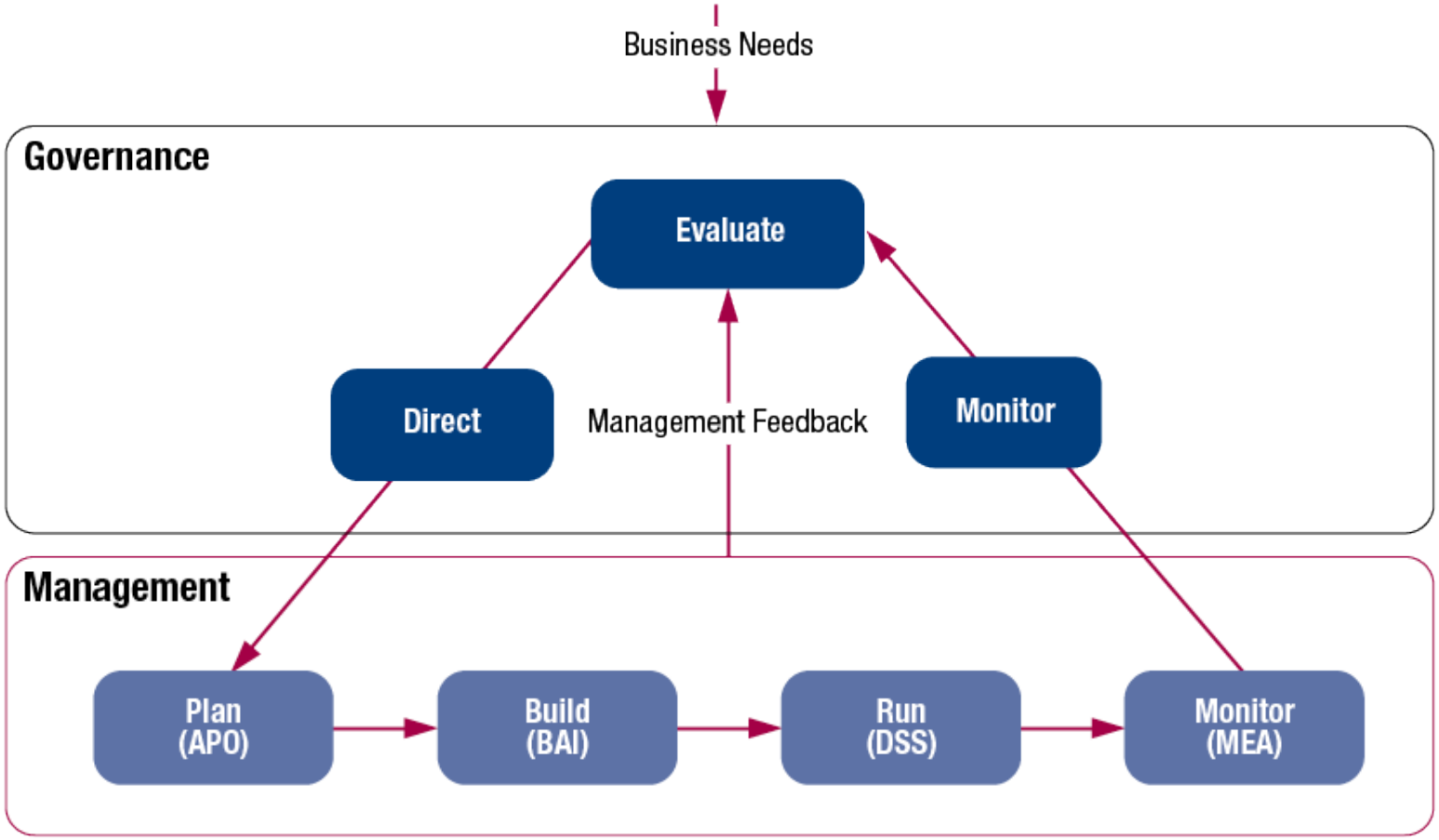
Son aquellos elementos que facilitan/apoyan la tareas de gobierno de ICT



Roles, actividades y relaciones



Estructura de COBIT



Processes for Governance of Enterprise IT

Evaluate, Direct and Monitor

- **EDM01** Ensure Governance Framework Setting and Maintenance
- **EDM02** Ensure Benefits Delivery
- **EDM03** Ensure Risk Optimisation
- **EDM04** Ensure Resource Optimisation
- **EDM05** Ensure Stakeholder Transparency

Align, Plan and Organise

- **APO01** Manage the IT Management Framework
- **APO02** Manage Strategy
- **APO03** Manage Enterprise Architecture
- **APO04** Manage Innovation
- **APO05** Manage Portfolio
- **APO06** Manage Budget and Costs
- **APO07** Manage Human Resources
- **APO08** Manage Relationships
- **APO09** Manage Service Agreements
- **APO10** Manage Suppliers
- **APO11** Manage Quality
- **APO12** Manage Risk
- **APO13** Manage Security

Build, Acquire and Implement

- **BAI01** Manage Programmes and Projects
- **BAI02** Manage Requirements Definition
- **BAI03** Manage Solutions Identification and Build
- **BAI04** Manage Availability and Capacity
- **BAI05** Manage Organisational Change Enablement
- **BAI06** Manage Changes
- **BAI07** Manage Change Acceptance and Transitioning
- **BAI08** Manage Knowledge
- **BAI09** Manage Assets
- **BAI010** Manage Configuration

Deliver, Service and Support

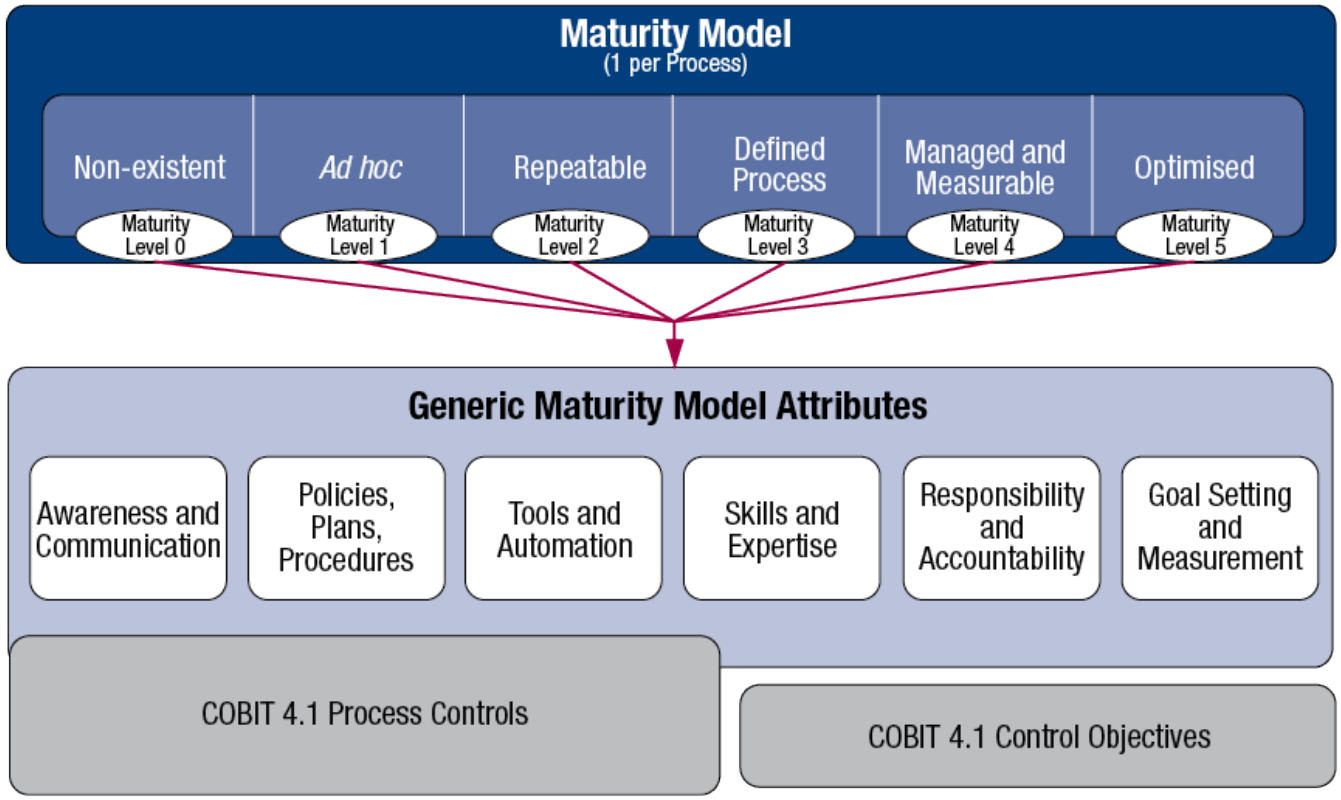
- **DSS01** Manage Operations
- **DSS02** Manage Service Requests and Incidents
- **DSS03** Manage Problems
- **DSS04** Manage Continuity
- **DSS05** Manage Security Services
- **DSS06** Manage Business Process Controls

Monitor, Evaluate and Assess

- **MEA01** Monitor, Evaluate and Assess Performance and Conformance
- **MEA02** Monitor, Evaluate and Assess the System of Internal Control
- **MEA03** Monitor, Evaluate and Assess Compliance With External Requirements

Processes for Management of Enterprise IT

Niveles de madurez



CCS-CSC

- The Critical Security Controls for Effective Cyber Defense

Este documento fue emitido por el Council on Cybersecurity y concentra un conjunto de 20 mejores prácticas para la implementación de controles de seguridad.

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ISA 62443

IEC 62443: INDUSTRIAL NETWORK AND SYSTEM SECURITY

- Es un estándar orientado al aseguramiento de la seguridad como parte de una estrategia corporativa de aseguramiento de productos

NIST SP 800-53

- **Security and Privacy Controls for Federal Information Systems and Organizations**

"This publication provides a catalog of security and privacy controls for federal information systems and organizations and a process for selecting controls to protect organizational operations (including mission, functions, image, and reputation), organizational assets, individuals, other organizations, and the Nation from a diverse set of threats including hostile cyber attacks, natural disasters, structural failures, and human erro[illegible]"

NIST
National Institute of Standards and Technology
U.S. Department of Commerce

INSTITUTO POLITÉCNICO NACIONAL
LA TÉCNICA AL SERVICIO DE LA PATRIA

Referencias

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[NISTCIB] Framework for Improving Critical Infrastructure Cybersecurity v1.0, NIST, 2014

[OECD05] European Central Bank, 2004, Annual Report: 2004, ECB, Frankfurt, Glossary.