

Identity-Governed Process Automation in Microsoft Cloud: Cross-Vertical Implementation Patterns and Security Frameworks

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Abstract: *Digital transformation initiatives across healthcare, finance, retail, and insurance sectors increasingly rely on cloud-based automation platforms that integrate robust identity governance with process optimization capabilities. Microsoft Cloud ecosystem, comprising Entra identity services, Power Platform components, and AI Builder, provides a unified architecture for implementing secure automation workflows tailored to industry-specific regulatory requirements. Healthcare organizations leverage Power Apps with HIPAA-compliant Entra policies to automate patient data access while maintaining stringent privacy controls. Financial institutions deploy role-based access controls integrated with AI-powered fraud detection mechanisms within loan approval workflows, ensuring both operational efficiency and regulatory compliance. Retail enterprises streamline employee onboarding and vendor management processes through Power Automate, while insurance companies enhance claims processing efficiency using document AI capabilities coupled with Conditional Access policies. These implementations demonstrate that identity-centric security models enable organizations to achieve operational excellence without compromising regulatory compliance or data protection standards when embedded within automation frameworks. The convergence of identity governance and process automation in the Microsoft Cloud represents a paradigm shift in how enterprises approach digital transformation, offering scalable, secure, and adaptable solutions that address the unique challenges of each industry vertical while maintaining a consistent security posture across all automated workflows.*

Keywords: Microsoft Cloud, identity-secured automation, Power Platform, enterprise compliance, vertical integration

INTRODUCTION

Overview of Digital Transformation and Automation Needs Across Industries

Digital transformation has fundamentally reshaped how organizations operate across all industry sectors, with automation emerging as a critical enabler of operational efficiency and competitive advantage. The Fourth Industrial Revolution has accelerated the adoption of intelligent automation technologies, transforming traditional business processes and creating new paradigms for service delivery [1]. As enterprises navigate this technological evolution, integrating robust security frameworks with automation capabilities has become paramount, particularly in regulated industries where data protection and compliance requirements govern operational decisions.

The Convergence of Identity Security and Process Automation

The convergence of identity security and process automation represents a significant advancement in enterprise technology architecture. Traditional automation approaches often treated security as an afterthought, leading to vulnerabilities and compliance gaps. Modern cloud-based platforms now embed identity governance directly into automation workflows, ensuring that every automated action is authenticated, authorized, and auditable. This integration addresses the fundamental challenge of maintaining security posture while accelerating business processes through automation [2].

Microsoft Cloud Ecosystem as an Enterprise Automation Platform

Microsoft Cloud ecosystem has emerged as a comprehensive enterprise automation platform, offering integrated services that span identity management, process automation, and artificial intelligence capabilities. The platform's architecture enables organizations to build secure, scalable automation solutions that adapt to industry-specific requirements while maintaining consistent security controls. Enterprises can implement end-to-end automation scenarios that meet operational and security objectives through services such as Microsoft Entra for identity governance, Power Platform for low-code automation development, and AI Builder for intelligent document processing.

Research Objectives and Scope of Vertical-Specific Implementations

This article examines the implementation of secure automation solutions across four key industry verticals: healthcare, finance, retail, and insurance. Each sector presents unique regulatory requirements, operational challenges, and security considerations influencing automation strategy and implementation approaches. The analysis focuses on organizations leveraging Microsoft Cloud services to address vertical-specific needs while maintaining enterprise-grade security and compliance standards.

STRUCTURE AND METHODOLOGY

The subsequent sections explore theoretical foundations of identity-secured automation, followed by detailed examinations of vertical-specific implementations. Each industry case demonstrates practical

applications of Microsoft Cloud technologies in addressing real-world automation challenges while adhering to regulatory requirements. The article concludes with a synthesis of cross-vertical patterns and recommendations for organizations pursuing secure automation initiatives.

Theoretical Framework and Microsoft Cloud Architecture

Identity-Centric Security Model in Cloud Automation

The evolution of cloud automation has necessitated a fundamental shift from perimeter-based security to identity-centric models that treat every interaction as potentially untrusted. This paradigm ensures that automated processes authenticate and authorize each action based on verified identities rather than network location or static credentials. Machine identity security has become particularly critical as non-human identities proliferate across cloud environments, requiring comprehensive lifecycle management and accountability frameworks [3]. The identity-centric approach establishes trust through continuous verification, enabling organizations to implement zero-trust principles within their automation workflows while maintaining operational efficiency.

Microsoft Entra (Azure AD) as the Identity Governance Foundation

Microsoft Entra is the cornerstone of identity governance within the Microsoft Cloud ecosystem, providing unified identity management for human and machine identities. The platform extends traditional directory services with advanced capabilities, including conditional access policies, privileged identity management, and identity protection features. These capabilities enable organizations to implement granular access controls that adapt to risk levels and contextual factors. The integration of workload identity management within Entra addresses the growing complexity of service-to-service authentication in automated environments, moving beyond traditional secret-based approaches to more secure, certificate-based authentication mechanisms [4].

Power Platform Components: Power Apps, Power Automate, and AI Builder

The Microsoft Power Platform comprises three core components that enable low-code automation development with embedded security controls. Power Apps facilitates rapid application development with built-in identity integration, allowing organizations to create custom interfaces that respect organizational access policies. Power Automate provides workflow orchestration capabilities that leverage Entra tokens for secure API interactions and cross-service communications. AI Builder introduces artificial intelligence capabilities into automated workflows, enabling intelligent document processing and decision-making while maintaining audit trails and access controls throughout the automation lifecycle.

Integration Architecture Between Identity Management and Automation Services

The architectural integration between Microsoft Entra and Power Platform services creates a unified security fabric across all automation scenarios. This integration operates through OAuth flows and managed identities, eliminating the need for embedded credentials in automation scripts or applications. The

architecture supports interactive and non-interactive authentication scenarios, enabling seamless transitions between human-initiated and fully automated processes. Service principals and managed identities provide secure communication channels between automation components, while centralized logging and monitoring capabilities ensure comprehensive visibility into all identity-related activities within automated workflows.

Table 1: Identity-Centric Security Components in Microsoft Cloud Architecture [3, 4]

Component	Function	Security Features	Integration Method
Microsoft Entra	Identity Governance Foundation	Multi-factor Authentication, Conditional Access, Privileged Identity Management	OAuth 2.0, SAML, OpenID Connect
Service Principals	Non-human Identity Management	Certificate-based Authentication, Managed Identities	Azure Resource Manager APIs
Power Platform Connectors	Secure Service Integration	Token-based Authentication, Least Privilege Access	REST APIs with OAuth
Audit Logs	Compliance Monitoring	Immutable Logs, Real-time Alerts	Azure Monitor Integration
Zero Trust Framework	Continuous Verification	Risk-based Access, Session Controls	Policy Engine Integration

Compliance and Regulatory Considerations in Automated Workflows

Regulatory compliance in automated environments requires careful consideration of data residency, access controls, and audit requirements specific to each industry vertical. The Microsoft Cloud architecture provides built-in compliance features including automated policy enforcement, continuous compliance monitoring, and detailed audit logging. These capabilities enable organizations to demonstrate regulatory compliance while benefiting from automation efficiencies. The platform supports industry-specific compliance frameworks through pre-configured policy templates and assessment tools, allowing organizations to implement automation solutions that meet stringent regulatory requirements without compromising operational agility.

Healthcare Sector: HIPAA-Compliant Patient Data Automation

Current Challenges in Healthcare Data Access and Management

Healthcare organizations face unprecedented challenges in managing patient data while ensuring accessibility for authorized personnel and maintaining strict privacy controls. The exponential growth of healthcare data, combined with the need for real-time access across multiple departments and facilities, creates complex operational requirements [5]. Legacy systems often create data silos that impede efficient care delivery, while manual access management processes introduce delays and potential security

vulnerabilities. The challenge intensifies when considering the diverse user base, including physicians, nurses, administrative staff, and external specialists, each requiring different levels of access to patient information.

Power Apps Implementation for Secure Patient Data Interfaces

Power Apps provides healthcare organizations with a low-code platform to develop custom applications that interface with patient data systems while maintaining security standards. These applications enable healthcare providers to create role-specific interfaces that present only relevant patient information based on user permissions and clinical context. The platform's integration with existing healthcare information systems allows for seamless data retrieval without compromising the underlying security architecture. Power Apps' built-in compliance features ensure that all data access and modifications are logged and traceable, supporting both operational needs and regulatory requirements [6].

Entra Policies Configuration for HIPAA Compliance

Microsoft Entra policies enable healthcare organizations to implement HIPAA-compliant access controls through sophisticated conditional access rules and identity governance features. These policies enforce multi-factor authentication for sensitive data access, restrict access based on location and device compliance, and implement session controls that prevent unauthorized data exfiltration. The configuration includes automatic de-provisioning of access rights when staff roles change, ensuring that former employees or those who change departments cannot retain inappropriate access to patient records. Entra's policy engine also supports break-glass scenarios, allowing emergency access while maintaining comprehensive audit trails.

Table 2: HIPAA Compliance Implementation in Healthcare Automation [5, 6]

HIPAA Requirement	Microsoft Cloud Implementation	Automation Feature
Access Control	Role-based Permissions with Entra	Automated provisioning/de-provisioning
Audit Controls	Comprehensive Activity Logging	Real-time compliance monitoring
Integrity Controls	Data Encryption at Rest and Transit	Automated encryption key management
Transmission Security	Secure API Gateways	Automated secure data routing
Physical Safeguards	Cloud Infrastructure Compliance	Automated backup and disaster recovery
Administrative Safeguards	Identity Lifecycle Management	Automated training assignments and tracking

Role-Based Access Control (RBAC) for Healthcare Professionals

The implementation of RBAC in healthcare automation requires careful mapping of clinical roles to appropriate data access permissions. Physicians receive comprehensive access to patient records within their specialty, while nurses access only information relevant to their assigned patients and shifts. Administrative staff obtain limited access to scheduling and billing information without clinical details. The RBAC framework extends to automated workflows, ensuring that automated processes operate with appropriate permissions and cannot access data beyond their designated scope. This granular control mechanism prevents both intentional and accidental data breaches while maintaining operational efficiency.

Case Study: Automated Patient Record Access Workflows

Healthcare institutions have successfully implemented automated workflows that streamline patient record access while maintaining HIPAA compliance. These workflows automatically provision access when healthcare professionals are assigned to patient care teams and revoke access when assignments end. The automation extends to cross-departmental consultations, where temporary access grants enable specialists to review patient records for defined periods. Integration with scheduling systems ensures that access rights align with shift patterns and on-call rotations, reducing administrative overhead while enhancing security through timely access revocation.

Performance Metrics and Security Audit Results

The implementation of automated patient data access systems demonstrates significant improvements in both operational efficiency and security posture. Organizations report reduced time for access provisioning, decreased incidents of inappropriate access, and enhanced ability to respond to audit requests. Security metrics show improved compliance scores, with automated systems maintaining consistent application of access policies that manual processes struggled to achieve. Regular security audits validate that automated workflows maintain appropriate access controls while providing comprehensive documentation for regulatory reviews. The automation of audit report generation further streamlines compliance activities, enabling healthcare organizations to demonstrate HIPAA compliance with minimal manual effort.

Financial Services: AI-Enhanced Fraud Detection and Role-Based Access

Regulatory Landscape in Financial Automation (SOX, PCI-DSS)

Financial institutions operate within a complex regulatory environment where automation initiatives must comply with multiple overlapping frameworks, including SOX and PCI-DSS requirements. The implementation of automated financial processes requires careful consideration of data security, transaction integrity, and audit trail maintenance. Organizations must ensure that automated systems maintain separation of duties, implement appropriate access controls, and provide comprehensive logging capabilities. The evolution toward cloud-based payment processing has introduced new architectural patterns that reduce PCI-DSS compliance scope through thin client implementations, minimizing the attack surface while maintaining operational efficiency [7].

Regulation	Key Requirements	Automation Implementation	Risk Mitigation Strategy
SOX	Financial Control Documentation	Automated audit trail generation	Continuous control monitoring
PCI-DSS	Cardholder Data Protection	Tokenization, Thin Client Architecture	Reduced compliance scope
Basel III	Risk Management Framework	AI-driven risk scoring	Real-time risk assessment
AML/KYC	Customer Identity Verification	Automated verification workflows	Multi-source validation
GDPR	Data Privacy and Protection	Consent management automation	Automated data retention policies

Table 3: Financial Services Regulatory Compliance Matrix [7, 8]

Implementing Role-Based Access in Loan Approval Workflows

Role-based access control in loan approval workflows ensures that financial professionals access only the information necessary for their specific responsibilities within the lending process. Loan officers receive permissions to initiate applications and gather customer information, while underwriters access credit reports and financial analysis tools. Senior managers obtain approval authorities based on loan amounts and risk profiles, with the system automatically routing applications to appropriate decision-makers. The implementation leverages Microsoft Entra to enforce dynamic access policies that adapt to transaction characteristics and risk indicators, ensuring both operational efficiency and regulatory compliance.

AI Builder Integration for Fraud Pattern Recognition

AI Builder enables financial institutions to develop and deploy machine learning models that identify potentially fraudulent transactions within automated workflows. These models analyze transaction patterns, customer behaviors, and contextual factors to generate risk scores that inform automated decision-making processes. The integration of AI-driven fraud detection within loan processing workflows creates multiple checkpoints where suspicious activities trigger additional verification steps [8]. The platform's ability to continuously learn from new data patterns ensures that fraud detection capabilities evolve alongside emerging threat vectors, while maintaining explainability requirements mandated by financial regulations.

Real-Time Alert Mechanisms Using Power Automate

Power Automate orchestrates real-time alert mechanisms that notify appropriate personnel when automated systems detect anomalies or high-risk transactions. These workflows integrate with multiple communication channels, including email, SMS, and dashboard notifications, to promptly respond to potential security incidents. The alert system implements intelligent routing based on severity levels, time zones, and staff availability, ensuring that critical issues receive immediate attention. Integration with case

management systems enables systematic tracking of alert responses and resolution activities, supporting both operational needs and compliance documentation requirements.

Case Study: Automated Loan Processing with Embedded Security Controls

Financial institutions have successfully deployed automated loan processing systems that embed security controls throughout the application lifecycle. These implementations automate document collection, verification, and initial assessment while maintaining strict access controls and fraud detection mechanisms. The workflow automatically validates customer identities through integration with external verification services, performs real-time credit checks, and applies AI-based risk assessment models. Each step in the process generates detailed audit logs that support both internal reviews and regulatory examinations. The automation extends to approval routing, where loans are automatically directed to appropriate decision-makers based on amount thresholds and risk profiles.

Risk Mitigation and Compliance Reporting

Automated risk mitigation strategies in financial services leverage continuous monitoring and adaptive controls to maintain security posture across all automated processes. The implementation includes automated compliance reporting that generates regulatory submissions without manual intervention, ensuring accuracy and timeliness. Risk metrics are continuously calculated and displayed through real-time dashboards that provide visibility into system performance, security incidents, and compliance status. The automation of compliance reporting reduces the burden on compliance teams while improving the consistency and completeness of regulatory submissions. Integration with governance, risk, and compliance platforms ensures that automated workflows operate within established risk tolerances and generate appropriate documentation for audit purposes.

Retail and Insurance: Operational Efficiency Through Secure Automation

Retail Subsection

Employee Lifecycle Management Challenges

Retail organizations face unique challenges in managing employee lifecycles due to high turnover rates, seasonal workforce fluctuations, and diverse role requirements across multiple locations. The complexity of provisioning appropriate system access for employees who may work across different departments or stores creates significant administrative overhead. Traditional manual processes often result in delays that impact employee productivity and customer service quality. The integration of artificial intelligence models into employee lifecycle management systems has emerged as a solution to these challenges, enabling predictive analytics for workforce planning and automated decision-making for access provisioning [9].

Power Automate Workflows for Onboarding Automation

Power Automate transforms retail employee onboarding through workflows that orchestrate multiple systems and processes from the moment a new hire accepts an offer. These workflows automatically create

user accounts, assign role-appropriate permissions, schedule training sessions, and provision necessary equipment. The automation extends to background check integration, document collection, and compliance verification, ensuring that new employees receive system access only after meeting all requirements. Integration with HR systems ensures that employee data flows seamlessly across platforms while maintaining data integrity and security throughout the onboarding process.

Vendor Management Portal Using Power Apps

Power Apps enables retail organizations to develop comprehensive vendor management portals that streamline supplier interactions while maintaining security boundaries. These portals provide vendors with self-service capabilities for updating product information, submitting invoices, and tracking order status without accessing internal retail systems. The implementation includes role-based interfaces that present different functionality to various vendor types, from small local suppliers to large distributors. Built-in approval workflows ensure that vendor-submitted changes undergo appropriate review before affecting production systems, while audit trails maintain complete records of all vendor activities.

Table 4: Retail vs Insurance Automation Components [9, 10]

Component	Retail Focus	Insurance Focus	Security Feature
Document Processing	Employee contracts	Claims documentation	AI-powered extraction with encryption
Identity Verification	Background checks	Claimant validation	Multi-source authentication
Approval Routing	Manager hierarchy	Adjuster expertise	Role-based dynamic routing
Self-Service Portal	Employee/Vendor access	Claimant/Agent access	Conditional access policies
Exception Handling	Failed verification	Suspicious claims	Automated escalation workflows

Identity Verification and Access Provisioning

Identity verification in retail automation requires balancing security requirements with operational efficiency, particularly for temporary and seasonal workers. The implementation leverages Microsoft Entra to perform automated identity verification through integration with government databases and background check services. Access provisioning automatically adjusts based on employee roles, schedules, and store assignments, with permissions dynamically updating as employees move between departments or locations. The system implements time-based access controls that automatically revoke permissions for seasonal workers at contract end dates, reducing security risks associated with dormant accounts.

Insurance Subsection

Claims Processing Bottlenecks and Document Handling

Insurance companies encounter significant operational challenges in claims processing due to the volume and variety of documents requiring review and validation. Traditional manual processes create bottlenecks that delay claim resolution and impact customer satisfaction. The implementation of automated document handling systems addresses these challenges by digitizing incoming documents, extracting relevant information, and routing claims to appropriate processors based on complexity and value. These systems maintain security through encrypted document storage and access controls that ensure only authorized personnel can view sensitive claim information [10].

AI Builder for Intelligent Document Processing

AI Builder revolutionizes insurance document processing through machine learning models that extract information from various document types, including medical reports, police reports, and damage assessments. These models automatically identify document types, extract key data fields, and validate information against policy details and coverage limits. The integration with claims management systems enables automatic population of claim forms, reducing manual data entry errors and accelerating processing times. The AI models continuously improve through feedback loops, adapting to new document formats and improving extraction accuracy while maintaining compliance with data protection regulations.

Conditional Access Policies for Claims Adjusters

Conditional Access policies in insurance automation ensure that claims adjusters access sensitive information only under appropriate circumstances and with proper authorization. These policies consider factors including adjuster certification levels, claim values, and geographic locations when granting access to claim files. Mobile device management integration enables secure field access for adjusters investigating claims on-site, with policies enforcing device compliance and data encryption. The implementation includes break-glass procedures for emergency situations while maintaining comprehensive audit trails of all access events for regulatory compliance and fraud investigation purposes.

Automated Routing with Security Checkpoints

Automated claim routing systems incorporate multiple security checkpoints that validate claim legitimacy and ensure appropriate handling throughout the process. These workflows automatically assess claim characteristics, including type, value, and complexity, to determine optimal routing paths. Security checkpoints verify claimant identity, policy status, and coverage eligibility before advancing claims through the process. Integration with fraud detection systems enables automatic flagging of suspicious claims for enhanced review, while legitimate claims proceed through streamlined processing paths. The routing logic adapts based on workload distribution and adjuster expertise, optimizing both efficiency and quality outcomes.

Comparative Analysis of Implementation Strategies

The implementation strategies for retail and insurance automation reveal both similarities and distinct differences driven by industry-specific requirements. Both sectors benefit from identity-centric security models and automated workflow orchestration, yet their applications differ significantly. Retail implementations focus on high-volume, rapid-turnover scenarios with emphasis on self-service capabilities and distributed access management. Insurance implementations prioritize document processing accuracy, complex decision logic, and regulatory compliance documentation. Both industries leverage AI capabilities, with retail focusing on predictive analytics for workforce management while insurance emphasizes document intelligence and fraud detection. The comparative analysis demonstrates that successful automation requires careful adaptation of platform capabilities to industry-specific operational patterns and regulatory requirements.

CONCLUSION

Implementing secure automation across healthcare, finance, retail, and insurance sectors demonstrates the transformative potential of Microsoft Cloud's integrated identity and automation architecture. Organizations across these verticals have successfully leveraged the convergence of Microsoft Entra, Power Platform, and AI Builder to address industry-specific challenges while maintaining robust security postures and regulatory compliance. Healthcare institutions achieve HIPAA-compliant patient data automation through sophisticated role-based access controls and automated workflows that balance accessibility with privacy protection. Financial services enhance fraud detection capabilities and streamline loan processing through AI-driven risk assessment models integrated within secure approval workflows. Retail enterprises overcome employee lifecycle management complexities through automated onboarding processes and vendor management portals that scale with operational demands. Insurance companies transform claims processing efficiency through intelligent document processing and conditional access policies that ensure appropriate information access while preventing fraud. These implementations collectively illustrate that identity-centric automation represents a technological advancement and a fundamental shift in how organizations conceptualize and execute digital transformation. The success patterns observed across these diverse sectors indicate that secure automation frameworks can adapt to varying regulatory requirements, operational scales, and business objectives while maintaining consistent security principles. As organizations evolve their digital capabilities, integrating identity governance with process automation will remain essential for achieving operational excellence without compromising security or compliance standards. The Microsoft Cloud ecosystem provides a proven foundation for this journey, enabling enterprises to build automated solutions that are simultaneously powerful, secure, and adaptable to future requirements.

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