Supply Chain Management and Visibility Improvements in Spite of Unstructured Data

PIDX

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Structured Data Examples in Supply Chain Management

Category	Structured Data
Inventory	SKU numbers, product IDs, quantities on hand, reorder levels
Procurement	Supplier names, purchase order numbers, prices, delivery times
Logistics	Shipping schedules, delivery tracking numbers, freight costs
Production	Bill of materials (BOM), machine utilization rates, production volumes
Sales & Orders	Customer IDs, order dates, quantities, transaction values
Warehouse	Bin locations, pick/pack times, barcode/RFID data
Planning & Forecasting	Historical demand figures, lead times, forecast accuracy metrics
Compliance & Audits	Certification IDs, audit dates, checklist scores

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Unstructured Data Examples in Supply Chain Management

Category	Unstructured Data
Product Quality	Images of defective goods, free-text quality reports
Supplier Communication	Emails, phone call transcripts, chat logs
Customer Feedback	Reviews, survey responses, social media comments
Logistics	GPS coordinates, traffic camera footage, driver notes
Document Management	PDFs, scanned invoices, contracts, packing slips
Visual Inspection	Photos or videos of goods, warehouse footage
Market Intelligence	News articles, analyst reports, competitor social media
Maintenance	Technician notes, voice recordings, repair logs

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Structured vs. Unstructured Data in Supply Chain Management

Aspect	Structured Data	Unstructured Data
Format	Tabular, relational databases	Free-form, no fixed format
Examples	Product IDs, quantities, delivery dates, pricing	Emails, PDFs, images, videos, call logs
Systems	ERP, WMS, TMS, databases	Email clients, document management systems, file storage
Use Cases	Inventory tracking, order processing, demand forecasting	Sentiment analysis, contract review, visual quality checks
Sources	Spreadsheets, forms, APIs	Scanned docs, social media, cameras, conversations
Analysis Tools	SQL, Excel, BI tools	NLP, computer vision, machine learning, OCR
Ease of Analysis	Easy to medium with correct tools	Complex, requires AI/ML
Value	Operational efficiency, accurate reporting	Contextual insights, risk identification

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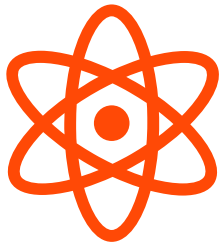
Before We Start: Key Terms



Agentic Automation

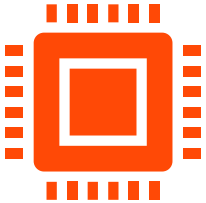
Overview: Outcome oriented orchestration that may use different technologies (agents, GenAI, RPA) to complete a task

Key Takeaways:
- Orchestration technology
- Leverages a wide range of capabilities to complete the goal
- Can actively rebalance based on workload and process requirements

AI Agents

Overview: Software workers that act semi-autonomously to complete a goal, often leveraging GenAI and RPA

Key Takeaways:
- Semi-autonomous automations
- Often task or business specific, requiring context grounding
- Can leverage multiple technologies to complete a goal, but is GenAI reliant



Generative AI

Overview: AI models that complete work in a ‘call & respond” methodology and typically don’t work autonomously

Key Takeaways:
- General AI models
- Can be made task specific through RAG or providing information in prompt
- Currently the most affordable AI technology implementation

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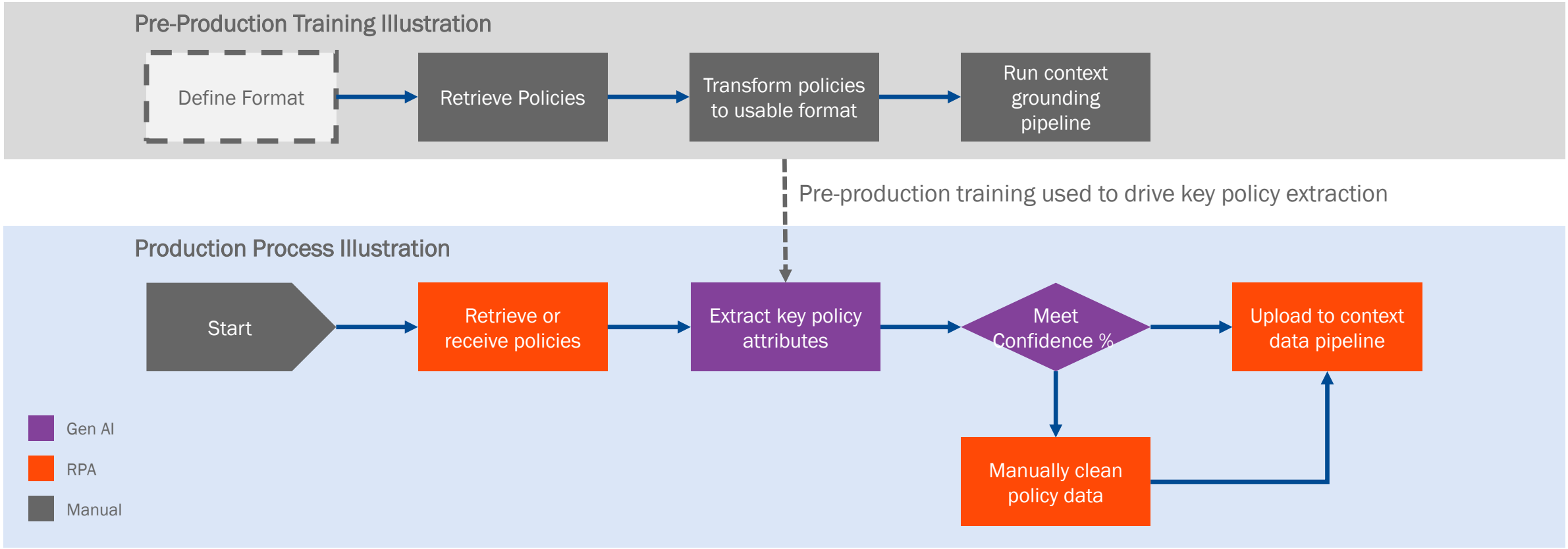
Implemented Solution: Procurement Policy Extraction



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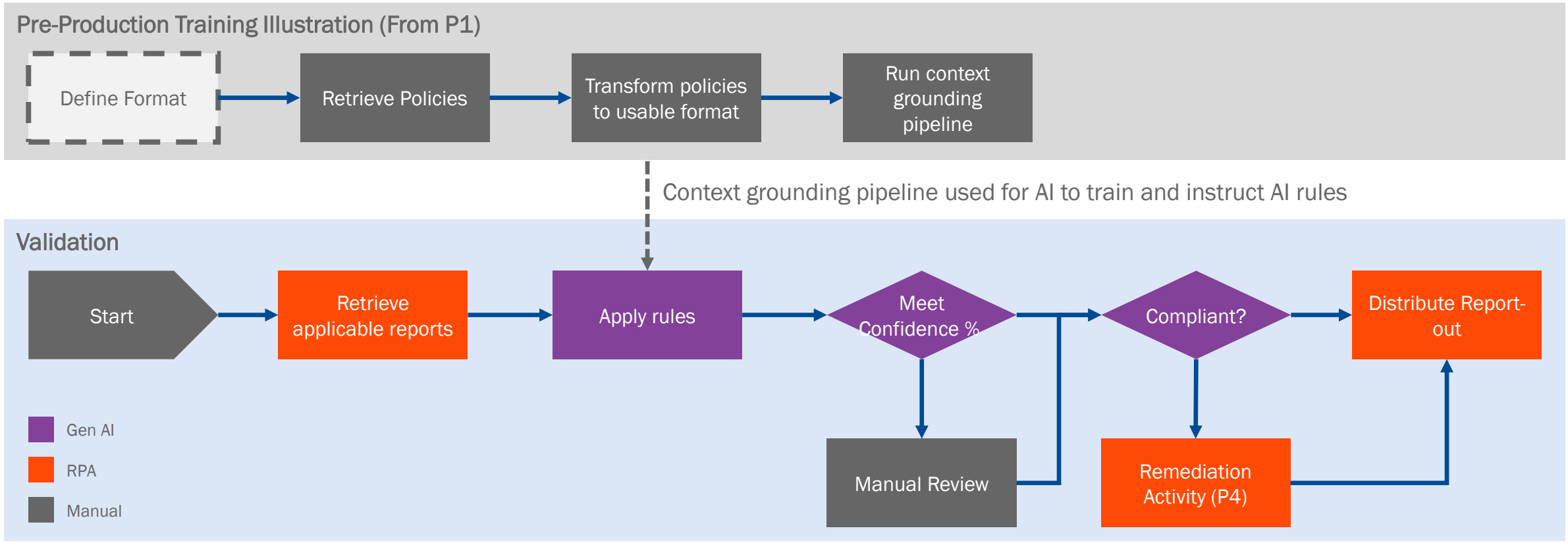
Implemented Solution: Procurement Policy Monitoring



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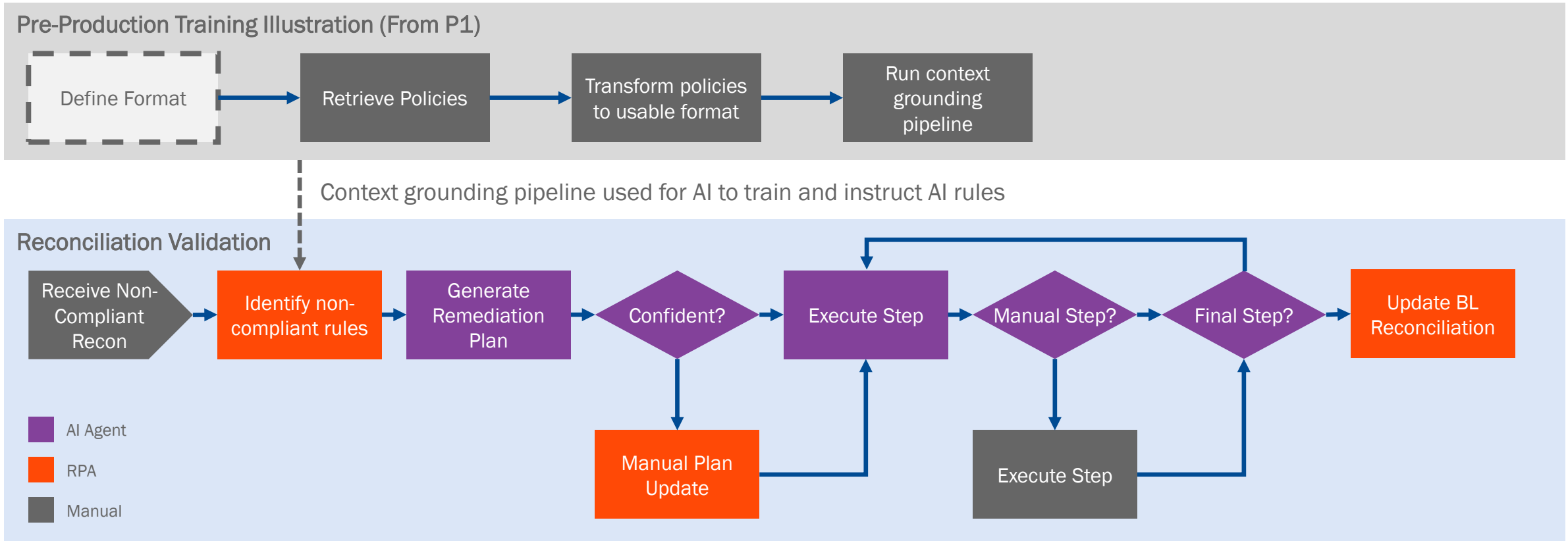
Implemented Solution: Procurement Policy Remediation Activities



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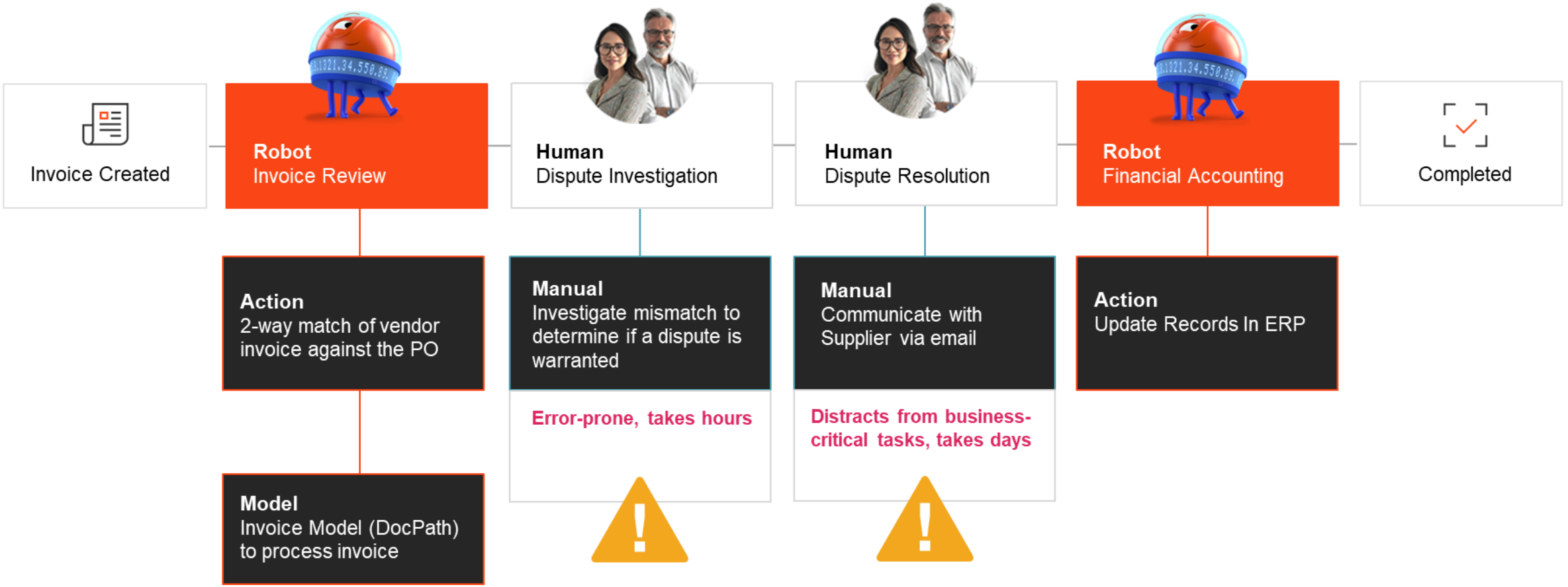
Processing Vendor Invoices

Robotic Workflow



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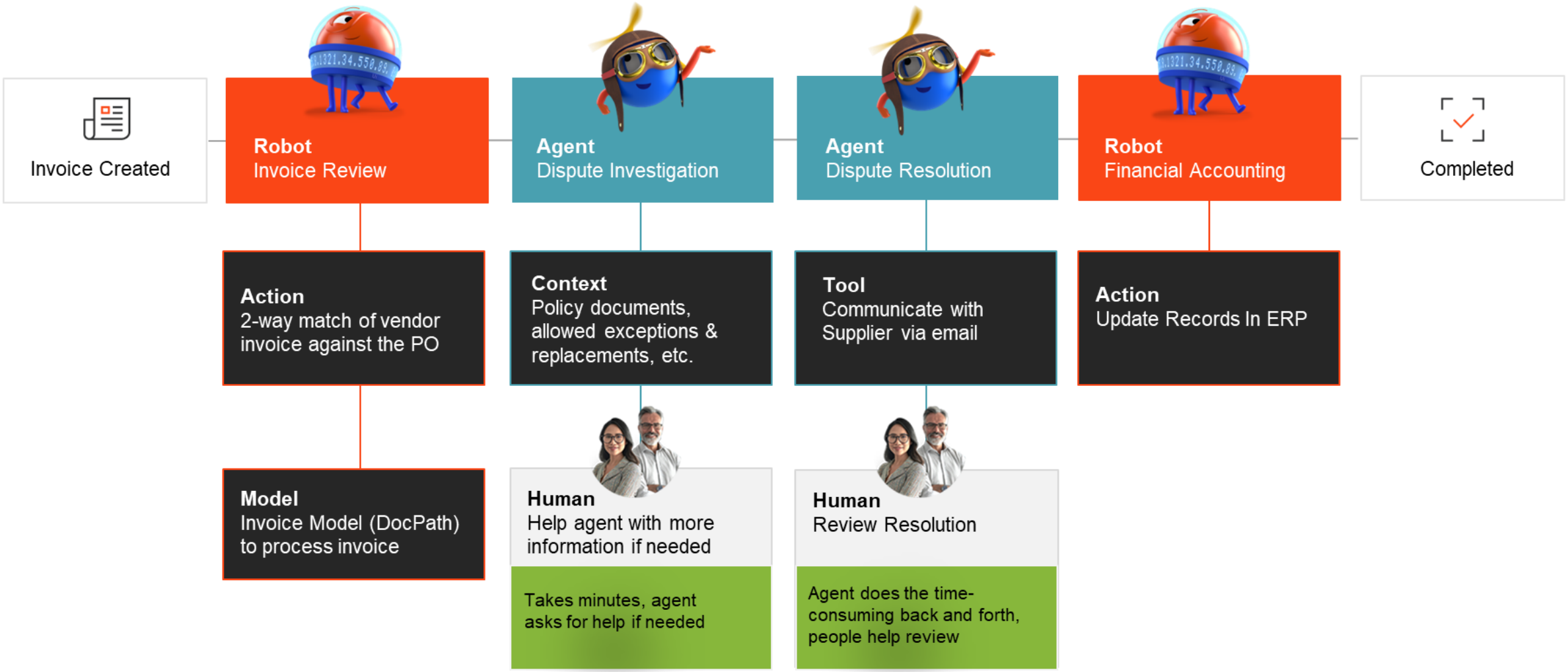
Processing Vendor Invoices

Agentic Workflow



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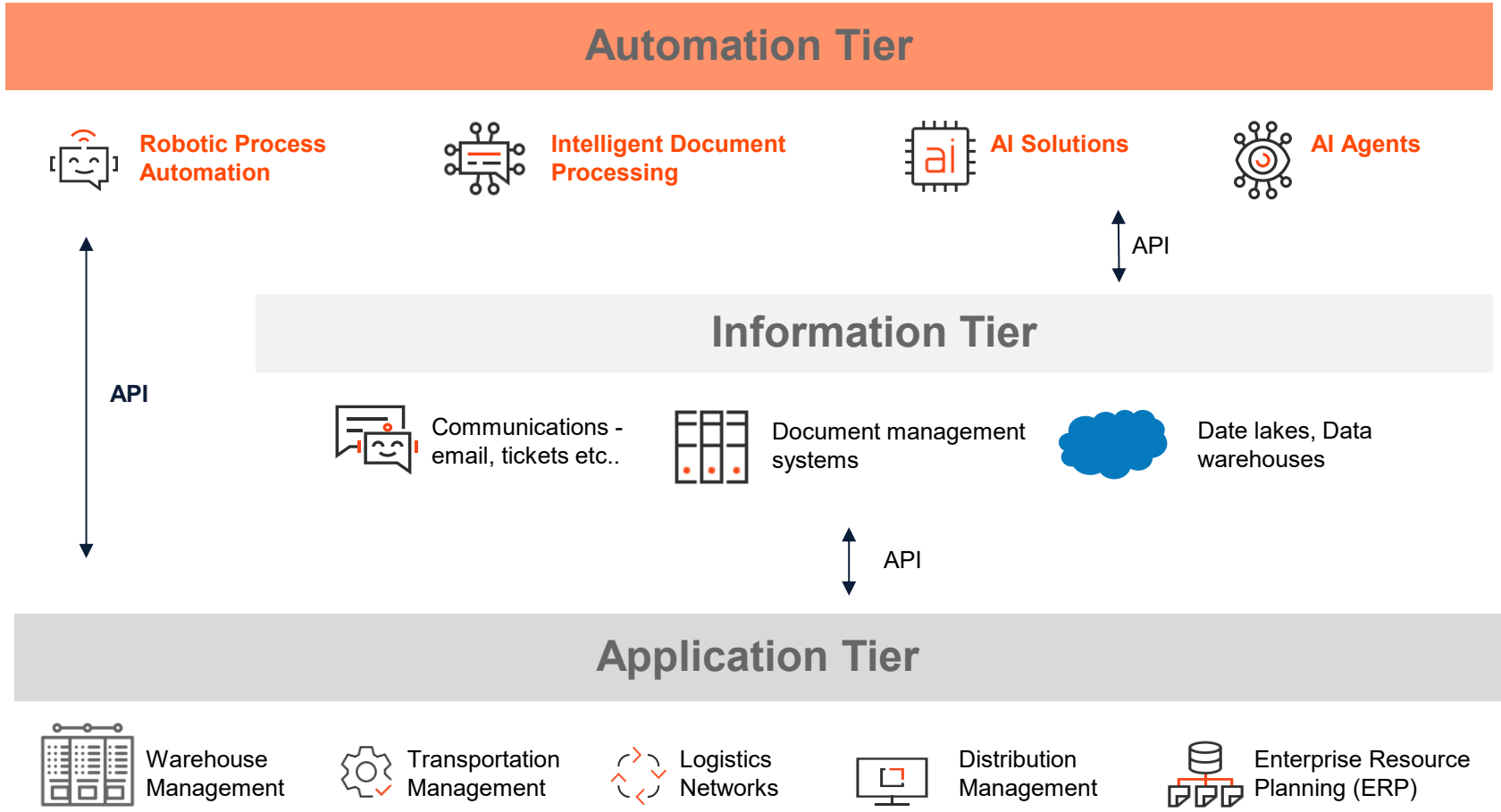
The logistics automation tier



Agentic orchestration principles

- Build a digital twin for your end-to-end processes and organizations
- Leverage the combination of robots, documents, AI solutions and AI agents for agentic orchestration of your processes
- Introduce a continuous learning loop to improve your processes
- Automate first, customize enterprise applications last

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Warehouse manager

Agentic orchestration processes inbound shipment documents, schedules appointments and generates outbound shipment documents automatically

Inbound document processing

Process documents	Automatic processing of Bill of Lading documents including two-way match with invoices and supporting freight documents
Schedule appointments	Automatic carrier appointment scheduling and dock-door assignment
People	Review inbound shipment documents

Outbound document processing

Provide context	Automatically combine customer order information with delivery requirements, local shipment regulations and legislations
Generate documents	Generate customer specific packing instructions, labels and Bill of Lading documents
People	Review outbound shipment documents

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Transportation manager

Agentic orchestration initiates carrier tendering, selects carriers, gathers expected time of arrivals, updates customers and ensures delivery compliance automatically

Freight tendering and carrier selection

Carrier selection	Automatic tendering and selection of carriers based on customer requirements and company guidelines
Generate communications	Automatic generation of delivery confirmation for selected carrier(s) and communication of expected delivery date/time to customer
People	Review selected carriers

Global trade document compliance

Provide context	Automatically combine freight document information with local material classification, trade regulations and legislations
Process documents	Automatically update import/export documents with correct material classification codes
People	Review freight documents

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Distribution manager

Agentic orchestration enables the allocation of inventory to sales-channels for customer order confirmations and to update customers about the delivery status.

Omni-channel inventory allocation

Provide context	Automatically combine company inventory information with business partner inventory updates to generate the most up-to-date inventory picture
Allocate inventory	Automatic update of inventory data as input for inventory allocation to sales channels (online, mobile, store, ...)
People	Review inventory allocations

Customer shipment queries

Provide context	Automatically combine customer orders, shipment information, carrier information and customer requirements as well as market risks
Generate communications	Automatically inform/update customers about the expected delivery date/time, carrier data, cost, carbon footprint, ...
People	Review expected shipment delays

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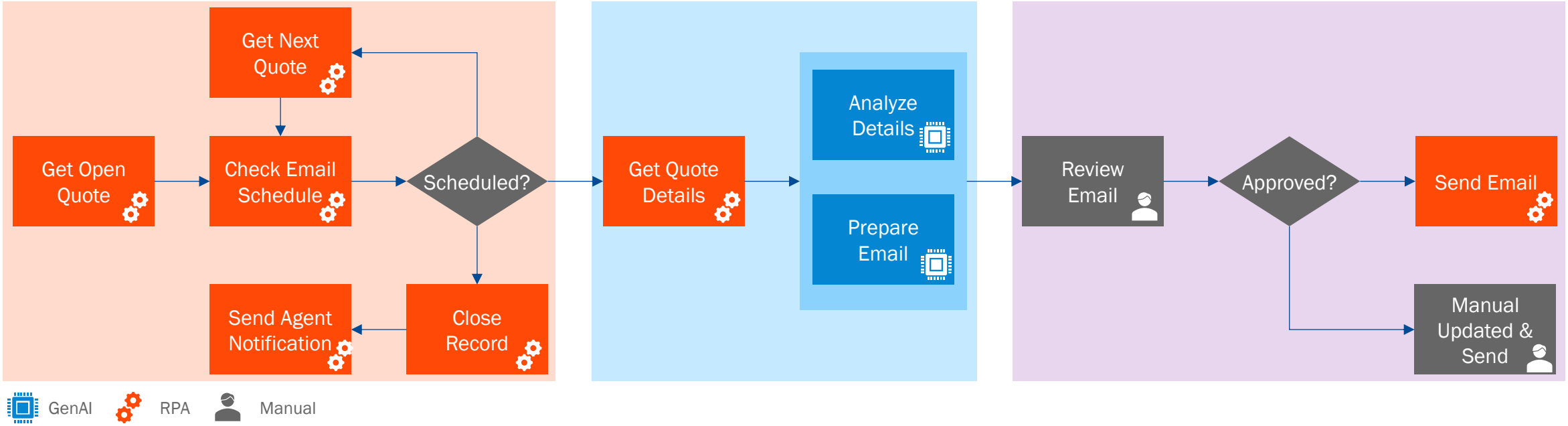
AI and Automation Solution Overview: Quotation Status and Follow-up

Our solution makes use of both RPA and LLM's to ensure each technology is being used to their strength: RPA for rule based, scheduled automation and LLM's for creative, tailored emails that require judgement



Step 1. Process Kick-Off

RPA initiates the process, checks email status and determines next steps:

- **Email Scheduled:** kick-off email generation
- **Post-Final Email:** close customer quote
- **Email Not Scheduled:** get next quote

Step 2. Generate Email

RPA & Gen AI get historical data and generate the email:

- RPA pulls data and generates email prompt
- GenAI tool analyzes input and prepares the email draft

Step 3. Approve and Send

The email draft is sent for timed-approval to an agent and can have the following outcomes:

- **Approved:** email is sent to customer
- **Rejected:** email is manually edited and sent
- **No Response:** email is sent once time expires

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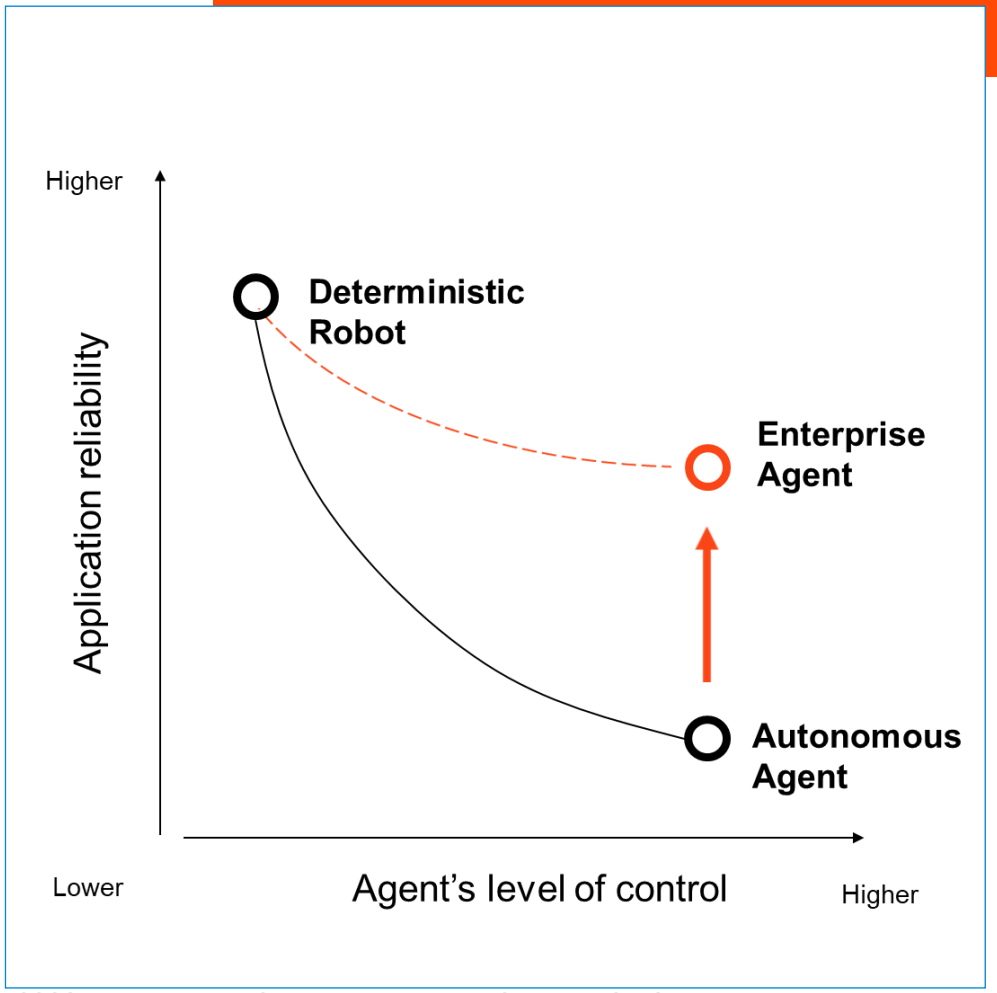
Enterprise and Controlled Agents



"Controlled Agency"

- **Prompt auto-tuning and model selection**
- **Interactive prompt experimentation**
- **Online and Offline Evaluations**
- **High-quality context grounding**
- **Testing agents**

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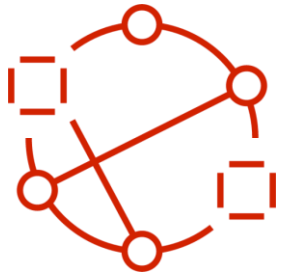
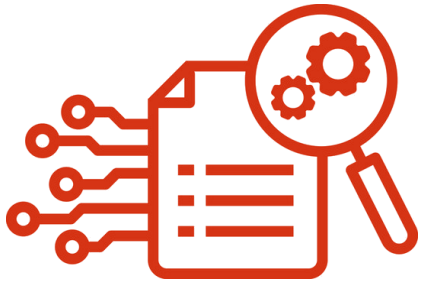
Important practices to adopt

Definition then Data



First make sure the definitions are accurate, then make sure data is accurate

Authenticate, curate, and protect your data

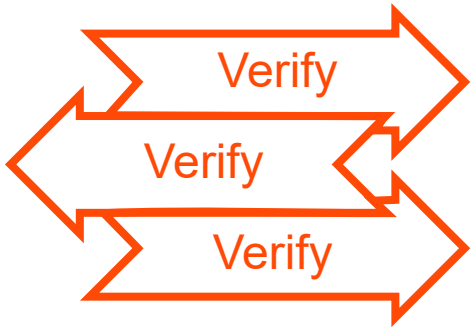


- Exposing confidential information to public AI models is inviting a breach
- Audit trails for compliance

Measure AI Productivity

- Like people, have AI agents' accountability and responsibility
- How much better your outcomes are

Verify AI results using expertise and/or independent sources



- Treat AI as a team member who you manage
- AI may help validate other AI results

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Let’s stay in touch!

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Thank you!

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