IBM Automation 2018

Technical Session: Task

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Digital Labor with RPA
What if your company could automate all repetitive human work activities?
Software robots are similar to physical robots

Physical robots
Perform repetitive physical tasks
Example:
- Pick eight chocolates from assembly line
- Assemble a finished box of chocolates

Software robots
Perform repetitive software tasks
Example:
- Log in to four different systems
- Navigate legacy screens to retrieve data
- Use data to open new account in system of record
Software robots come in many flavors

**Software robots**

Perform repetitive **software** tasks, examples:
- Log in to four different systems
- Navigate legacy screens to retrieve data
- Use data to open new account in system of record

**Chatbots**: personalized cognitive interaction with customers

**Script bots**: headless automation such as spam email

**Automation bots**: business automation via seamless UI interaction
**ROBOTIC PROCESS AUTOMATION (RPA)**

enables companies to easily automate repetitive tasks in order to free up employees to perform higher value work

**HOW RPA WORKS:**

- No changes to existing user interfaces
- Reduces errors associated with swivel chair integration
- Efficiently execute high volume work
Key benefits of Robotic Process Automation

- **Accelerate time to value**: Create, test and deliver new automations in days or weeks.
- **Reduce human error**: Eliminate copy/paste mistakes introduced by swivel chair integration.
- **Increase throughput**: Fulfill automated tasks in seconds or minutes, round the clock.
- **Decrease development costs**: Develop automations quickly with simple record/playback functions.
Digital labor extends RPA to unlock its full potential

- **Right brain**
  - Cognition based

- **Left brain**
  - Rules based

- **Memory**
  - Content Management

- **Central nervous system**
  - Coordination & orchestration

- **Eyes**
  - Data capture

- **Hands**
  - Software robots
IBM Automation Platform for Digital Business
IBM Automation Platform for Digital Business

Unified User Experience

Data Capture

Tasks
Content
Workflow
Decisions

Operational Intelligence | Machine Learning | Governance

On-cloud | Hybrid | On-premises
IBM Automation Platform for Digital Business

Unified User Experience

Data Capture

Tasks

Content

Workflow

Decisions

Operational Intelligence | Machine Learning | Governance

On-cloud | Hybrid | On-premises
Digital labor enables businesses to remix the distribution of work

**Central nervous system + hands**
- Orchestrating the right balance of repetitive work & knowledge work
- **Example:** Handling claims exceptions at scale

**Left brain + hands**
- Separating complex rules from repetitive tasks
- **Example:** Calculating discounts during order entry

**Eyes + hands**
- Extraction and action on information from unstructured content
- **Example:** Interpreting and matching invoice data with the contract
Combining workflow with RPA – example 1: Workflow refers work to RPA tasks to improve automation of manual tasks

Claims Processing example

Policy holder:
1. Submits claim information

Workflow:
2. Orchestrates claims process (including humans, systems & robots)
5. Routes claim for financial review
6. Routes claim for approvals

RPA:
3. Retrieves data from claim system, policy application & provider system
4. Enters data into claim system

Workflow extends the value of RPA by:
- Monitoring and enforcing Service Level Agreements
- Managing exception processes
- Managing end-to-end process
- Tracking the status of exceptions
Combining workflow with RPA - example 2: RPA tasks trigger workflows to take action in specific situations

Insurance Policy update exception

*Policy holder:*  
1. Submits update to policy information

*RPA:*  
2. Enters updated policy data into system  
3. Identifies conflicting data (birthdate on update does not match birthdate on policy)  
4. Initiates process to resolve conflicting data

*Workflow:*  
5. Orchestrates human exception process to resolve  
6. Sends updated info to RPA to update policy system

Workflow extends the value of RPA by:

- Managing exception processes
- Tracking the status of exceptions
- Monitoring and enforcing Service Level Agreements
- Managing escalations
Combining decisions with RPA

Order Entry task example

Customer:
1. Places order

RPA:
2. Opens order
3. Retrieves order data
4. Invokes decision to calculate discounts
5. Calculates discount amount for each line item
6. Logs in to ERP system
7. Inputs data into ERP

Decisions:
5. Calculates discount amount for each line item

ERP:
8. Validates order
9. Submits order for fulfillment

Decision management extends the value of RPA by:

• Managing and governing business decisions outside of RPA
• Enabling non-technical business users to maintain operational decisions
• Enabling business automation to be changed rapidly
• Reusing business decisions across the enterprise
Combining data capture with RPA

Invoice Entry task example

Vendor:
1. Sends email with invoice attached as PDF document
2. Opens email
3. Opens PDF attachment

RPA:
4. Interprets invoice
5. Passes relevant fields to RPA
6. Logs in to invoice system
7. Inputs invoice data
8. Compares invoice data against contract

Data capture extends the value of RPA by:

- Analyzing unstructured content to produce clean, structured data as required by RPA
- Eliminating or reducing the manual work required to interpret documents
- Minimizing exceptions
- Learning from corrections
IBM RPA with Automation
Anywhere Technical Overview
IBM RPA with Automation Anywhere Platform

Bot Creators
- Create
  - Web apps
  - Desktop apps

Control Room
- Manage
  - Bot repository
  - Bot scheduler
  - Version control
  - User management
  - Role-based access
  - Audit trail

Bot Runners
- Run
  - Playback

DBA Express
- Workflow, Content, Capture, Decisions
Easily create bots using purpose-built recorders

Use Recorders to record interactions between applications

Choose an Option

- **Smart Recorder**: Record web & desktop application screens, independent of screen size or window location
- **Screen Recorder**: Record web & desktop application screens when screen size & window location don’t change
- **Web Recorder**: Special features for recording web applications
Edit bots with the Task Editor

- **Variables** to for data exchange between bot steps
- **Data Acquisition** form from input files or other systems
- **Loops** to iterate thorough bots
- **If-then-else** for control flow
- **Error Controls** for exception handling
Manage & schedule bots from the Control Room

- **Dashboard** to view bot activities
- **Repository Manger** to manage uploaded bots
- **Task Scheduler** to deploy bots to Bot Runners and manage bot dependencies
- **Operation Room** to view the control room history and tasks in progress
- **User Management** to configure users (developers, Bot Runners, administrators)
- **Audit Trail** to displays all Control Room events
Run bots automatically or launch from desktop

- Bots can be scheduled to start automatically from Control Room
- Bots can be launched manually from desktop
Automation Anywhere RPA Software Components

Client - Bot Creators

Control Room - Bot Management and Deployment

Client - Bot Runners
Automation Anywhere Product Topology Overview

- **SQL Server DB** - stores data: users (if not Active Directory is used), user roles, user permissions, etc.
- **SubVersion** - can optionally be used to have version control on tasks, metabots, workflows etc.; check-in, check-out, version history, rollback
- **File Store** - only required for distributed installation where a network path is required as repository path
- **Active Directory** - can optionally be used to store the users
- **Mail Server** - can optionally be configured for email notifications to users, recommended as account creation, password resetting etc. is managed through this
- **Load Balancer / Replicator** - required for high availability, see HA/DR guide for details, but these are Windows components
Task Editor Palette

- **Keystrokes / Mouse**
  - Edit mouse moves and key strokes

- **Program / Files / Windows**
  - Interact with Windows OS elements (files, windows, etc.)

- **Conditions / Loops**
  - Add programming construct

- **Pause / Delays / Wait**
  - Wait for window to show up before clicking on it

- **Internet**
  - Start Web browser window, upload a file, call REST API...

- **Tasks / Scripts**
  - Interact with recorded tasks

- **Applications**
  - Interact with applications (DB/Excel) and files (XML/CSV)

- **Interactive**
  - Insert message box, get input

- **Miscellaneous**
  - Variable or Clipboard, String operations,

- **System**
  - Printers, Services, LDAP

- **Advanced**
  - Fault handlers, Image processing

- **Integration Pack**
  - Work with PDF, receive emails,
  - App Integration and Terminal Emulator

- **Security**
  - Encrypt / decrypt files

- **SAP**
  - Work with SAP GUI
Speed & Scale
One of the most user-friendly user interfaces allowing non-developers to build automations.

**Step 1 - Record**
- Intuitive user interface
- Over 500 drag and drop commands
- Easy integration with common data sources such as excel, csv, database etc.
- Work with common business applications like Office, ERP etc.

**Step 2 – Edit auto generated script**
- Combined with Bot Velocity methodology allow us to scale fast at enterprise levels....
The New Bot Economy – Automation Anywhere Bot Store

- Online marketplace for pre-built bots
- Accelerates RPA initiative time to value
- Launched March ’18 @ Imagine, London

10+ Categories

200+ Bots

1000+ Downloads

10000+ Unique Visitors
IBM RPA Demonstrations
IBM RPA Integration Patterns
Four IBM RPA Integration Patterns

<table>
<thead>
<tr>
<th>Robot completes a task</th>
<th>Robot starts a process</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Robot completing task" /></td>
<td><img src="image2" alt="Robot starting process" /></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Process starts a robot</th>
<th>Robot becomes smarter</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image3" alt="Process starting robot" /></td>
<td><img src="image4" alt="Robot becoming smarter" /></td>
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</tbody>
</table>
Robot completes a task
Two sub patterns

**RPA bot + Process Portal UI**

RPA bot interacts with BPM Process Portal and BPM UI
RPA bot mimics actions of a knowledge worker completing a task

**RPA bot + BPM API**

RPA bot invoke IBM BPM REST API directly via REST binding
Use JSON Metabot to convert RPA variables to/from JSON
Example 1 – Create Sales Order (SAP Transaction)

*Robot does work instead of a person*
Example 1 – Create Sales Order SAP Transaction

Robot does work instead of a person

Robot claims and completes tasks

Robot wakes up

Robot goes back to sleep when all tasks are completed
Example 2 – Legacy Core Banking Application

*Robot does work instead of a person and provides an API to a system that doesn't have one*
Example 2 – Legacy Core Banking Application

Robot does work instead of a person and provides an API to a system that doesn't have one

Robot does what the human is instructed to do...
- Faster
- Without errors
- Without supervision
Two sub patterns

**RPA bot + Process Portal UI**

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RPA bot mimics actions of a knowledge worker completing a task

**RPA bot + BPM API**

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Use JSON Metabot to convert RPA variables to/from JSON
BPM Orchestrates Bots

BPM Process can orchestrate independent bots:
- Bots can accept input variables from the process
- Bots perform work
- Bots pass output variables back to the process

Bot Tasks are implemented as User Tasks

User Tasks implementation:
- Specify input and output variables to communicate with the Bots
- No need to implement Coaches
Robot is launched from a process
Launching Robot from BPM

1. **Automatically Indirectly (via triggers)**
   - By triggering one of the AA Task Triggers

2. **Automatically Directly (via AA API)**
   - New API is available from Enterprise edition 10 SP2 with product version 10.5.0

3. **Directly from a Task (by knowledge worker completing a task)**
   - As a part of task completion knowledge worker starts a Robot to get some information required for task completion
1. Automatically Indirectly - Task Triggers

**Window** triggers a task when an application window:
- Opens / Closes

**File** triggers a task when a file is:
- Created / Deleted / Renamed / Modified

**Folder** triggers a task when folder or file in a folder is:
- Created / Deleted / Renamed / Modified

**Performance** triggers a task when:
- CPU usage reaches a level that you specify (in %).
- Amount of free disk space is reached that you specify in megabytes (MB).
- Number of processes that you specify are running.

**Process** triggers a task when a system Windows Process:
- Starts running / Stops running

**Service** triggers a task when a system Windows Service:
- Starts running / Stops running / Resumes running / Pauses

**Email** message triggers a task when an email is received

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**Task TRIGGERS:**
External events that trigger robots

**Triggers are related to native Windows events. Triggering these events how do we trigger these events from BPM?**
Example - Email notification triggers a robot

Robot does work instead of a person and provides an API to a system that doesn't have one

Robot #2 launches BPM Process Portal and completes the task specified in the email (uses the task identification retrieved by the robot #1 from the email)

Robot #2 launches robot #2 to do the work!

Email (task assignment notification triggers robot #1)
Robot launches a process
External Invocation Bindings in RPA

REST
– the HTTP methods GET, PUT, POST and DELETE are supported.

SOAP Web Service
– Command supports the following only:
  • Content Type: Text/XML
  • Encoding Type: UTF-8 Format
  • Authentication Type: Basic Authentication
Task to launch a process instance

1. Retrieve csrf token from BPM

3. 5. 6. JSON MetaBot

Convers JSON to Variables vice-versa

8. Start a process instance
Example – Web Data Extraction

On a periodic basis robot extracts web data and compiles complex reports (.csv format), the extracts some process relevant data from the reports.

The robot invokes REST API the input parameters contain the data extracted from the reports.

THIS STARTS a PROCESS INSTANCE
Example – Document Processing for BPM

Robot is triggered when email arrives and extracts documents and metadata from the email.

Robot adds the document and the metadata via IBM Content Navigator IBM FileNet ECM external document store.

THIS TRIGGERS a DOCUMENT CREATION EVENT in BPM.
Example – Customer Service

1. On receiving a new ticket in the customer support email, RPA triggers a bot.
2. Bot extracts data contained in the email.
3. Bot launches a new ticket handling process with the data contained in the email.

Watson classifies the ticket based on the subject using the “Natural Language Classifier” and prioritizes the ticket based on the email’s tone using the “Tone Analyzer.”

The data provided by Watson is used by the system to route the ticket to the appropriate team in the support staff which then handles the ticket.
Robot becomes smarter
Robot becomes smarter
All decision categories apply to task logic in Robots!

<table>
<thead>
<tr>
<th>Category</th>
<th>Decision Type</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eligibility</td>
<td>Integrity</td>
<td>What am I considered to be? What Business State am I in?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>A Preferred Customer; in the US Western Market; on Risk Watch; Late Payment</td>
</tr>
<tr>
<td></td>
<td></td>
<td>What do I qualify for?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Products; Pricing Plans; Tax Rates; Marketing Programs</td>
</tr>
<tr>
<td>Validation</td>
<td>Integrity</td>
<td>Am I in a valid State?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Complete, Accurate, Consistent, Correct</td>
</tr>
<tr>
<td>Computation</td>
<td>Behavior</td>
<td>Compute Me; Configure Me</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Set values to ensure that the enterprise’s knowledgebase is always rational, in a valid business state</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pricing; Discounts; Taxes; Metrics; Product Configurations</td>
</tr>
<tr>
<td>Process</td>
<td>Behavior</td>
<td>Here is the Business State I am in.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>What Do I Do Next?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Usually Event Specific</td>
</tr>
<tr>
<td>Authority</td>
<td>Behavior</td>
<td>Do I have access to this information?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Am I allowed to perform this action?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Are there limits on how often I can perform a process or on the what I can approve (e.g. monetary signing authority)?</td>
</tr>
</tbody>
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Two IBM ODM with IBM RPA Integration Patterns

**ODM decision API + RPA bot**
RPA bot invoke decisions directly via REST or Web Service binding
Use JSON Metabot to convert RPA variables to/from JSON

**ODM decision Web UI + RPA bot**
RPA bot interacts with Web UI automatically generated form ODM decision services
Web UI interacts with ODM decisions via REST or Web Services API
1. Invoking ODM Decisions from a Robot

Robot can use AA REST or Web Services integrations to invoke ODM decision within a script

Getting ODM binding information:
Retriece HTDS Description File from IBM Decision Server:
1. Web Service WSDL file
2. REST Open API (Swagger) file

Invoking ODM Decisions from task script
– Use HTDS WSDL file to create
   SOAP Web Service
– Use HTDS Swagger to create
   REST Web Service
1. Example – Robot Uses ODM to Compute Order Configuration

- A robot enters sales order in SAP
- Upon copying the Material entry field, robot invokes ODM decision service to ensure all pre-requisite parts are present in order
- ODM decision returns the pre-req part numbers
- Robot adds these part number to SAP GUI
2. Example – Invoice generation using generated ODM Web UI

1. Bot copies Category, Price and Quantity form CSV file and
2. Gets response from ODM
3. Copies Rate and Discount to Invoice form

Most of the data copied directly from CSV file to Invoice Form

Use generated ODM decision Web UI to derive VAT (Rate) and discounted price
2. ODM Decision Forms Generator (open source contribution)

NPM (NodeJS) express server connected to an ODM Decision Server

Forms are automatically generated, reading the Decision Service swagger file

Get open source contribution odm-decision-forms: https://github.com/ODMDev/odm-decision-forms
Robot becomes smarter

WATSON
Bots can leverage Watson Cognitive Services

Use Watson Cognitive Services to convert unstructured data to structured data for use by bots in desktop automations.
Example – Language Transition

Robot calls Watson Language Translation API via REST

Use Watson language detection API to discover what language is used
Robot becomes smarter

IBM Datacap
How does IBM Datacap work in concert with IBM RPA?

IBM Datacap efficiently captures, accesses, analyzes critical transactional business content, producing clean structured data that robots need to operate continuously and efficiently.

- Feeds data to robots from non-digital channels like mail, fax, email and mobile capture
- Digitizes and extracts data with cognitive capture
- Identifies errors before they get to the bots, minimizing exceptions
IBM Datacap identifies errors before they get to the bots

**Minimizes Exceptions**

- High quality recognition using 3 commercial OCR/ICR engines
- Extracts data using text analytics, NLP, structural analysis
- Cleans results – e.g. common substitution errors -- oO0 i11 B8
- Built-in data validation – patterns, lookups
- Identifies potential exceptions
- Includes human intervention via correction workflow
- Learns from corrections
IBM Datacap

Extracts sales order information from scanned documents
Saves sales order information in MS Excel or CSV files
Use IBM RPA creates sales orders in SAP from data in EXCEL
Four IBM RPA Integration Patterns

- Robot completes a task
- Robot starts a process
- Process starts a robot
- Robot becomes smarter
Thank you

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