



IEEE Recommended Practice for Implementation and Management Methodology for Software-Based Intelligent Process Automation

IEEE Corporate Advisory Group (CAG)

Developed by the
IEEE SA Board of Governors

IEEE Std 2755.2™-2020

STANDARDS

IEEE Recommended Practice for Implementation and Management Methodology for Software-Based Intelligent Process Automation

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IEEE SA Board of Governors
of the
IEEE Corporate Advisory Group (CAG)

Approved 3 December 2020

IEEE SA Standards Board

Abstract: Provided in this recommended practice is a comprehensive methodology for technology domain exploration, development of strategy, technology evaluation, implementation, management, operations, program optimization, and successful enterprise scaling for IPA programs while utilizing terminology as established in IEEE Std 2755™-2017 and technology taxonomy as established in IEEE Std 2755.1™-2019. This recommended practice is a compilation of best practices from industry leaders on the proven methods from the initial discovery and exploration of the transformative capabilities of IPA technology through to developing and running an enterprise-wide program.

Keywords: AI, artificial intelligence, automation center of excellence, autonomic, business process automation, business process management, center of excellence, cognitive computing, digital labor, digital process automation, digital workforce, IEEE 2755.2™, intelligent process automation, machine learning, narrow AI, process choreography, process discovery, process mining, process orchestration, robotic desktop automation, robotic process automation, RPA

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Introduction

This introduction is not part of IEEE Std 2755.2–2020, IEEE Recommended Practice for Implementation and Management Methodology for Software-Based Intelligent Process Automation.

Since 2015, many new software-based Intelligent Process Automation (IPA) products have been introduced to the market. Many thousands of enterprises have embarked on some kind of process automation journey. Much has been learned about the best practices at each stage of the journey, from just learning about process automation all the way through to enterprise-wide deployment and successful value realization from the transformative capability of these IPA technologies.

This standard sets forth a structured methodology from inception through full adoption, broken into the following six stages:

- 1) Exploration: Understanding IPA technologies, uses, applications, and value potential
- 2) Strategy: Assessing enterprise potential and creation of an effective roadmap for success
- 3) Evaluation: Leveraging IEEE Std 2755.1™-2019, evaluating and selecting technology(ies)
- 4) Implementation: Organizing resources and capabilities to successfully deploy IPA
- 5) Management and Operations: Best practices for operating and supporting IPA in production
- 6) Optimization and Scaling: Program expansion and maximization of value delivered

The collective experience of the Working Group includes exposure to thousands of highly successful, partially successful, stalled, and unsuccessful programs. Through research and evaluation of what is common across highly successful programs, this recommended practice is a comprehensive methodology that spans:

- Organizational structures, roles, and performance objectives
- Resources and skills
- Strategies
- Activities, practices, tactics, and outcomes
- Measures of success

Each stage is fully explained with outcomes, objectives, and guidance on the activities needed to comprehensively complete all of the objectives of a stage. Each successive stage builds upon the outputs from the former stages and establishes a logical progression of capability.

This recommended practice is intended to provide a reference methodology that is comprised of the evidence-based best practices across thousands of deployments and with the unanimous agreement of the Working Group.

It is intended to be used in conjunction with IEEE Std 2755™-2017 and IEEE Std 2755.1–2019 comprising a useful set of coordinated resources for any organization setting out on establishing an automation program.

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1. Overview

This recommended practice is provided to support optimal selection, assessment, and adoption of products and services from the rapidly expanding family of complementary technologies available for automating enterprise operating processes. Its recommendations are based on the collective knowledge and experience of developers, consultants, system integrators, service providers, and end users.

A word on documentation: In an environment of rapid and continuous technology innovation, Intelligent Process Automation (IPA) is a dynamic activity. Likewise, underlying business strategies and processes are constantly evolving to address new opportunities. Detailed documentation is essential for the entire IPA plan and program. It should include stakeholder identification, key roles and responsibilities [business, Center of Excellence (CoE), IT, consultants, vendors], process change maps, decision points, milestones, and detailed execution and escalation procedures. All stages of the program need to be documented and regularly updated for audit, security, traceability, etc., purposes—to facilitate conformance checks and (if needed) any repair and/or remediation activities. All changes or deviations from the agreed IPA plan should likewise be recorded and flagged.

1.1 Scope

This recommended practice describes implementation and management approaches and methods for enterprise implementation of Software Based Intelligent Process Automation (SBIPA) technologies (commonly known as IPA). The recommended practice includes the exploration of technology capabilities, development of strategy, product evaluation, platform implementation, along with management and governance for service providers and end users.

1.2 Purpose

This recommended practice provides guidance for implementation and management of SBIPA capabilities. Best practices are needed in this emerging and rapidly growing technology domain to advance industry capabilities in the implementation and management of SBIPA technologies.

1.3 Word usage

The word *shall* indicates mandatory requirements strictly to be followed in order to conform to the standard and from which no deviation is permitted (*shall* equals *required to*).^{1,2}

The word *should* indicates that among several possibilities one is recommended as particularly suitable, without mentioning or excluding others; or that a certain course of action is preferred but not necessarily required (*should* equals *recommended that*).

The word *may* is used to indicate a course of action permissible within the limits of the standard (*may* equals *permitted to*).

The word *can* is used for statements of possibility and capability, whether material, physical, or causal (*can* equals *able to*).

2. General overview and structure

Experience has shown that the best outcomes from IPA result from adherence to a disciplined methodology for identifying, assessing, selecting, implementing, managing, and optimizing the most appropriate products and technology architectures. This recommended practice identifies six discrete but interrelated stages in that methodology, as outlined in [Clause 3](#) through [Clause 8](#). These stages should be executed in sequence for an IPA initiative that is just starting, but various stages are appropriate to revisit throughout the life of an IPA program.



Figure 1—The six stages of IPA methodology

Each stage includes a structured approach including: Objective(s), Participation, Methodologies, Activities, and Outcomes. Below is a summary of each stage and its high-level outcomes.

2.1 Exploration

The objective of the Exploration stage is to investigate the suitability of an IPA initiative for a business unit or business in advance of setting out any strategic directives. The investigation is completed through leveraging a variety of people, tools, and methodologies along with defined industry practices to understand the relevant pros and cons to IPA adoption.

2.2 Strategy

Based on the findings and insights gained from the Exploration stage, the objective of the Strategy stage is to assess how IPA can support and/or enhance the enterprise strategic business plan and technology environment in ways that maximize opportunities and benefits while controlling risks.

¹The use of the word *must* is deprecated and cannot be used when stating mandatory requirements, *must* is used only to describe unavoidable situations.

²The use of *will* is deprecated and cannot be used when stating mandatory requirements, *will* is only used in statements of fact.

2.3 Evaluation

The objective of the Evaluation stage of work is to select the most appropriate technologies and product architectures to deliver the outcomes and benefits identified in the Strategy workstream.

NOTE—IEEE Std 2755.1–2019 provides a comprehensive technology evaluation guide.

2.4 Implementation

The purpose of the Implementation stage to design, configure, build, test, and deploy automations that will deliver the targeted business outcomes identified in the Strategy stage using the architectures and technologies selected for deployment in the Evaluation stage.

2.5 Management and Operations

The objectives of the Management and Operations stage are to assure the reliable performance of automations in production, and to identify new deployment opportunities for current automation tools and new IPA tools that can enhance capability, performance, and value.

2.6 Optimization and Scaling

The purpose of the Optimization and Scaling stage is to support the sustainable growth of IPA programs while mitigating risks. When scaled, IPA technologies create additional value by improving productivity, expanding enterprise capacity, and supporting the expansion of new products, solutions, and business models.

3. Exploration



Figure 2—Exploration

3.1 Objective

The objective of the Exploration stage is to investigate the suitability of an IPA initiative for a business unit or business in advance of setting out any strategic directives. The investigation is completed through leveraging a variety of people, tools, and methodologies along with defined industry practices to understand the relevant pros and cons to IPA adoption.

3.2 Participation

Listed below are the key enterprise functions, roles, skills, and disciplines required to survey the growing range of IPA technologies and assess their potential for value creation in the context of the organization's purpose and culture, against the possible risks and challenges associated with deployment. These include both internal and external resources (as needed), whose involvement would be either temporary or permanent.

Table 1—Internal and external resource participation

Function	Description	Internal to CoE/ External to CoE (Business ops teams/ enterprise business functions/ third parties)	Temporary/Permanent
Strategy	Enterprise strategy	Internal/External	Temporary
IT	Technology strategy, policy and resources	Internal/External	Permanent
Finance	P&L Measurement and Oversight	Internal	Permanent
Operations	GBS Management Business Process Management (Six Sigma, etc.) BPO providers	Internal/External	Permanent

3.3 Methodologies

To explore the suitability of IPA for either a business or a business unit, a series of methodologies and approaches should be considered to consolidate the various stakeholder viewpoints. The methodologies underpin a series of activities and outcomes later within this stage.

- a) Internal strategy assessment: Prior to investing significant effort into external discovery activities, it is important to understand the internal drivers for the exploration of IPA. While the second stage of work involves defining the strategy for IPA, exploration should be accompanied by an understanding of how the business or business unit will measure value. For example, an internal aspiration of rapid cost reduction will require a different perspective to one underpinned by an aspiration to maximize net promoter scores.
- b) Industry/competitive gap analysis: The exploration of IPA may occur in response to an industry or competitive adoption of the capability. Understanding the benefits (quantified or perceived) by other similar organizations can inform evaluations into the applicability of these to internal ways of working.
- c) Business impact assessment: It is common for business initiatives to include some form of transformation which can have wider impacts on the business. Should IPA have been adopted in the industry or by competitors, then a level of understanding can be taken to measure the business impact from either a time, effort, or resource perspective. Should there be known complexities in working with areas of the business, then understanding if IPA initiatives are dependent on those areas is key.
- d) Cost justification/business case: The exploration activity for the initiative will have some level of acceptable funding, whether it be allocation of time or a budgetary account. Should the IPA initiative be progressed, however, there should be an understanding of how the scope of activities will be executed and funded. Vendors and service providers may make some aspects of their product and education/enableness available at no cost; however, any significant adoption of IPA will require explicit funding. Understanding how these internal gateways are met should be an early consideration.
- e) Existing partner/advisor suitability assessment: The exploration activities may be supported by entities already known to the business in the form of existing partners and/or advisors, as well as specialist IPA implementation firms. Their knowledge of their client's business or business units accompanied by their own experience in IPA may provide a useful perspective on the suitability of such an initiative.
- f) Analyst insights: IPA is a category covered by many analyst organizations as well as industry advisory channels. Analyst firms specifically will have resources aligned to both the IPA category as well as industry sectors, and specific subscriptions or service arrangements may allow for a briefing on

suitability. A range of non-subscription services is also available in the form of events and roadshows. Selecting a variety of analyst opinions and research is very helpful during the Exploration stage.

NOTE—While the methodologies in this standard are static in their definition, the resources they reference will continue to be updated as the industry evolves.

3.4 Activities

The activities associated with the Exploration stage will overlap with other recognized practices for product fit and suitability assessments. While these activities are described in detail, IPA exploration initiatives should also seek to leverage complementary methods, practices, and preferences specific to the organization.

- Business objective definition—cost reduction, competitive differentiation, continuous improvement, etc.
- Overlapping and supporting business initiatives and projects
- Vendor exclusion policies and practices (geographies/open source, etc.)
- Competitor evaluation—existing and potential
- Business impact exploration—incremental/limited versus transformational
- Business motivation and cost justification requirements
- Business case requirements
- Advisor evaluations, including listening sessions from relevant (existing) partners and associates
- Business readiness plan (following research of initiative implications)
- Analyst briefings/conferences

3.5 Outcomes

The following outcomes serve as a series of gateway measures to improve the completeness of the exploration of an IPA initiative with structured, pragmatic activity. While not all the outcomes have to be explored or met, it is recommended that all be considered and documented before a judgment is made.

- Documented and clearly defined business-focused vision of what the Exploration stage should deliver. (Note that this is different from the strategic vision for an IPA initiative.)
- Documented identification and categorization of the instant motivations for exploring the potential of an IPA initiative (cost saving, growth, CX, acquisition, etc.).
- Documented identification of dependencies of a IPA initiative or factors which conflict, i.e., the deployment of other company-wide systems deployments or major change programs.
- Documented competitive analysis to understand existing supplier (services/technology) relationships and how they impact or relate to IPA.
- Documented review against Exploration stage vision and mission.
- Documented conclusions and considerations collected through the Exploration stage that support the recommendation to proceed or not.

4. Strategy



Figure 3—Strategy

4.1 Objective

IPA represents a transformational technology capability that demands strategic focus and attention, both operationally and competitively.

Based on the findings and insights gained from the Exploration stage of activity, the objective of the Strategy stage is to assess how IPA should be integrated into both the enterprise strategic business plan and technology environment in ways that maximize opportunities and benefits while controlling risks. Where no current or formal plans exist, IPA can serve as a catalyst for initiating a strategy review and developing or updating a formal plan.

The *business strategy assessment* should consider ways in which IPA can improve organizational efficiency and effectiveness by optimizing current operations processes, e.g., enhancing current and potential addressable market opportunities, and better anticipating and aligning with customer requirements.

The *technology strategy assessment* should include determination of IPA's impact on existing enterprise technology platforms, investments and policies, as well as legacy IT governance practices.

In both business and technology domains, the assessment should include identification of prospective dependencies, expected outcomes and returns, and prospective cost/benefit targets.

This stage of work should establish the high-level enterprise agenda for IPA in the context of an organization's ability to innovate and execute, and its capacity for sustainable change. This assessment may well lead to comprehensive revision of existing business and technology strategies; ultimately, the business and technology strategies that exist should be complemented by the use and implementation of IPA.

4.2 Participation

Key participants from the Exploration stage activities will likely continue serving in this stage of work. However, at this point the team should be augmented and elevated with senior policy and business executives (typically C-1 level) from major enterprise functions and communities of interest: Strategy, Finance, IT, Operations, Shared Services, Business Process Management, Procurement, Risk, HR, Customer Service, and R&D. Representation should also be sought from ad hoc groups in various functions that may be exploring or piloting IPA technologies.

Key external advisory and consultancy firms—both strategy and technology—can also provide valuable input based on their knowledge of the firm's strengths and weaknesses as well as their experience with and knowledge of similar efforts and results in comparable industries and companies.

4.3 Methodologies

There are several well-known strategic planning tools, models, and resources that can be used to provide a framework. Most suggest identifying first the basic enterprise competitive strategy—cost leadership, differentiation, or market focus.

In general, the IPA enterprise strategy should follow a basic structure.

- a) Gather and analyze the market forces
 - 1) Identify strategic issues
 - 2) Analyze markets (and opportunities and competitive threats)
 - 3) Assess where customers are pleased and disappointed or have unmet needs
 - 4) Synthesize this all in a SWOT (strength, weakness, opportunity, threat)
- b) Define the business strategy
 - 1) Mission—core purpose
 - 2) Value—core beliefs
 - 3) Vision—what success looks like in five years
 - 4) Competitive differentiators
 - 5) Strategic objectives—markets the enterprise will focus on, products or services it will sell, how it will win
 - 6) Financial projections—how success will be measured
- c) Build the strategic plan
 - 1) Definition of current priorities
 - 2) Divestments from other priorities to improve focus
 - 3) Definition of KPIs to measure success/progress
 - 4) Translation to organizational, department, and individual team member goals and budgets
- d) Ongoing performance management
 - 1) Strategic communications plan
 - 2) Management cadence (i.e., in-year reporting, updates)
 - 3) Measurement and progress of KPIs
 - 4) Annual plan updates based on measured progress versus anticipated

4.4 Activities

The planning team should consider in a structured forum and format key questions, issues, and opportunities raised by IPA as they will potentially impact the organization's existing strategy, operating model, and competitive landscape. The strategy should include a specific focus on the potential for disruption both internally and competitively.

- a) How IPA can enable the core business strategy
 - 1) Can IPA enable differentiation? Cost leadership? Focus?

- 2) Can IPA enable non-differentiated functions to operate more efficiently, allowing the organization to focus on its differentiated core competency(ies)?
- b) Organizational ownership and accountability of IPA
 - 1) Creation of a full-time dedicated role/owner to oversee the IPA program
 - 2) Accountability and measurement framework for the role and initiative
 - 3) Governance of IPA projects that the organization will target
 - i) Criteria for investment
 - ii) Representation of business stakeholders to better align with business needs
 - iii) Development management and oversight systems and practices
 - iv) Measurement of outcomes
- c) Governance assessment of IPA projects: In evaluating whether to invest in an IPA project or not, the organization should consider at a high level how an IPA program aligns with the overarching business strategy.
 - 1) Initial due diligence assessment of the nominated project's strategic alignment (e.g., differentiation, cost, focus)
 - i) **What:** Identify the problem that the enterprise or function needs to address
 - i) What is the problem or opportunity?
 - ii) What end-to-end processes of the business are impacted?
 - iii) What parts of the process are inefficient/ineffective?
 - iv) How does this problem or opportunity align to the core business strategy (differentiation, cost leadership, focus)?
 - v) If no alignment, does solving this problem enable the business to better focus on its core competency/business strategy?
 - ii) **Why:** What is the associated value that will be created if that problem or opportunity is addressed?
 - i) What business outcome requires intervention or improvement?
 - ii) Does that value proposition align with the business strategy?
 - iii) How can that outcome be measured, and how does it align to the KPIs defined in the overarching business strategy?
 - iv) What is the current baseline?
 - iii) **Who:** Who is impacted by the problem or opportunity?
 - i) What business stakeholders benefit from this solution?
 - ii) What business stakeholders require sponsorship?
 - iii) What end users/employees integrated within the process will be impacted?
 - iv) How are the end users'/employees' decision-making abilities adversely impacted due to the current process?

4.5 Outcomes

Depending on the scope of the contemplated IPA program, the work output from this stage of work may be a new or significantly revised enterprise strategic plan, including prospective outcomes, benefits, and risks associated with deploying IPA, along with a high-level timetable and operating budget for the IPA initiative. Frequently, IPA programs begin in a single function or business unit to prove the strategic objectives can be met,