Intelligent Automation Platform Enabling Build and Supporting Adaptive Applications with AI

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Definition of Intelligent automation

"Intelligent automation is about real business change and long-term value. If you're serious about transforming the nature of work in your organization through automation, you need to think beyond robotic process automation (RPA) and point solutions. A true intelligent automation strategy utilizes a combination of powerful technologies like AI, RPA, and data access alongside established processes to work holistically, resulting in smarter systems and actionable data insights."

Introduction

Since the 80s, it has been a dream to bring flexibility and simplicity to enterprise software that supports operational business activity without the need to code. Early research with a business driver established how this could be achieved putting build into hands of business, recognizing the fact that change is inevitable and needs to be readily supported by the software.

It was also recognized that one of the important requirements was to deliver automation of many routine actions supporting users in real time all-in-one holistic build environment supporting a future-proof investment for users. Such an approach would bring tangible empowerment of people at work to improve both job satisfaction and productivity. One of the issues is, that this approach, being radically different as a complete integrated Platform and not fitting any existing industry tag, was what to call it? However, a recent definition suggests "Intelligent Automation" is an appropriate description given 3 important aspects:

1. the build of enterprise level applications at a click without coding
2. the significant amount of proven capability in business process automation and
3. the evolution of understanding automation possibilities working with early adopters to create intelligence in solutions.

Build where Intelligent Automation starts at a "click"

The focus to build next generation operational applications need to adopt the "outside in" BPM approach with the focus on where data is created by people and their processes at work. It should allow business to be the driver in creation and cover all needs yet contained in a single "Platform". It recognizes that in reality, business is simple when analyzed down to the basics. Early research established some 13 generic task types (including the UI) which could be pre-coded expressed as data and ready for customization. The next step was to allow build to take place in a Graphical Build Designer where, using a declarative technique at a click, the customized application was ready to run. This effectively removed the need to code business applications which supported not just quick build but any required future

changes. This could be regarded as the first step in holistic automation in delivery of flexible future proof applications. The ability to intelligently automate custom build of applications is long overdue by putting build and changes into hands of business skills not "IT".

Case study: 18 Years proof of Intelligent Automation in build and change

This has now been well-proven by early adopter UK Sport now running for over 18 years in their Case Management for allocation and payment of awards to UK Elite athletes and supporting programs.

A quote from a member of staff sums up the power of such a change supporting long term value; "Great to meet with you this morning and see the work you have done. It captures all my weird and wonderful ideas and all done without telling me that I am expecting too much!"

Total number of awards processed = 33,997

Total value of awards administered = £2bn

Total process maps developed and deployed over 18 years = 342

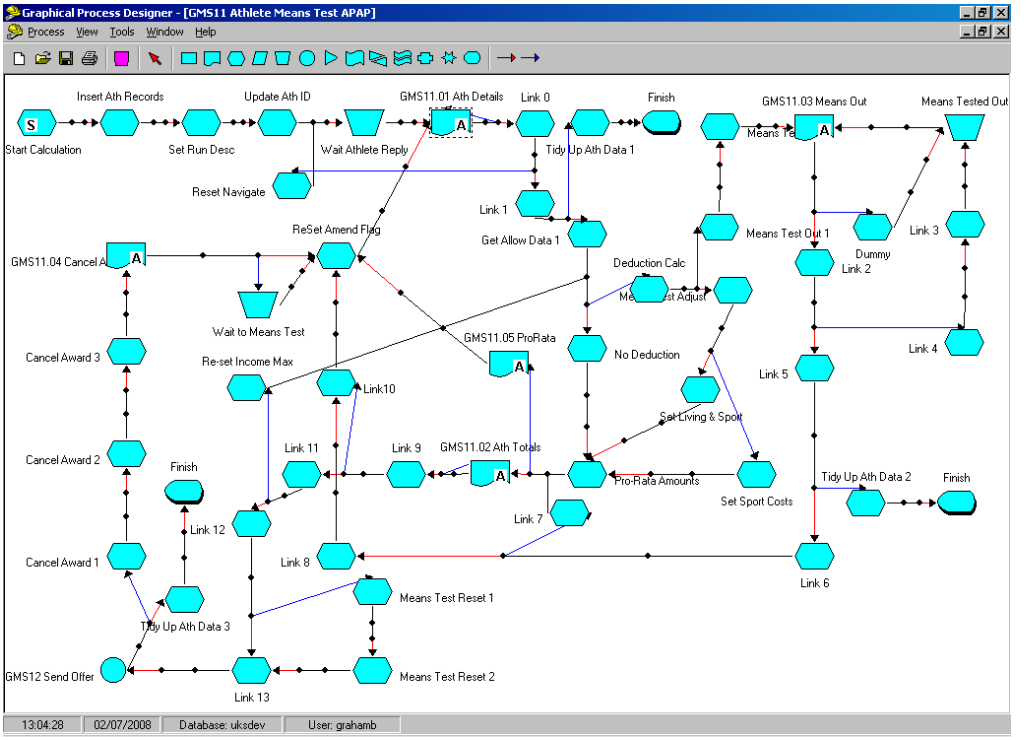
Total process tasks developed and deployed over 18 years = 7,877

Active process maps (those that are currently in use) = 102

Active tasks = 2071 of these tasks 418 are user interfaces

Example a deployed process application map with 55 Tasks

Total cost since original build (18+years) Less than £900K

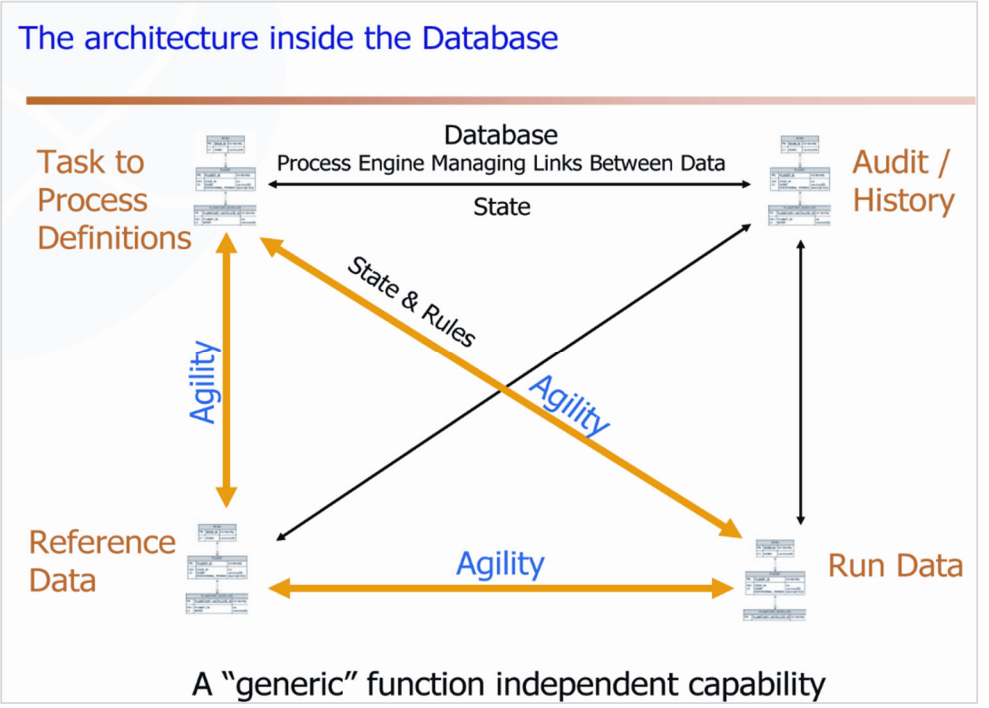


Means testing selected Athletes

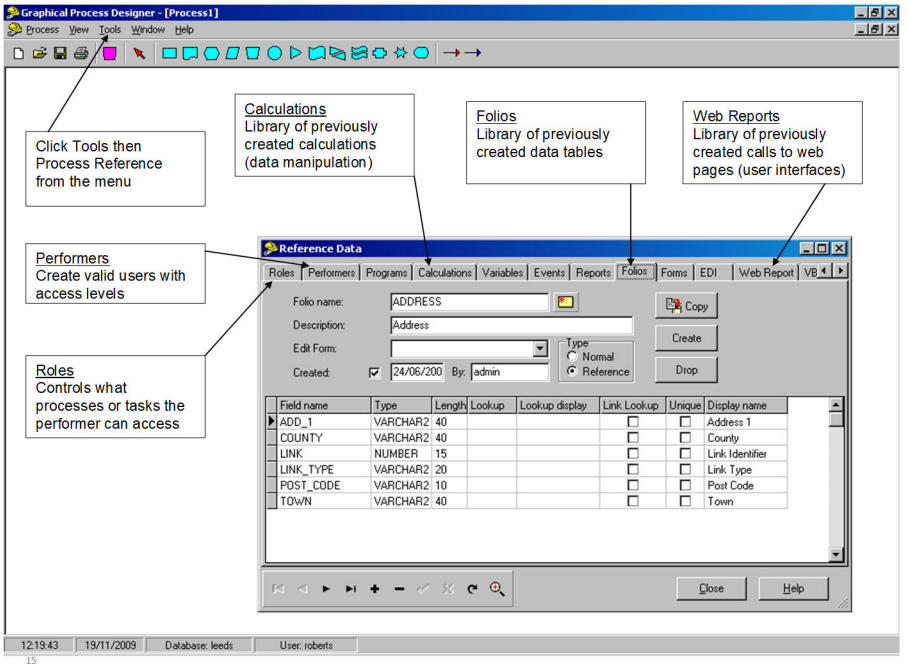
How this build environment was created

This initiative involved a few very able programmers directed by business knowledge which had established it in reality. There are 13 or so "generic" task types that addresses all business requirements that support people (and machines) at work where all data is created. It was recognized that the relational data base had huge potential for connectivity, and it was established that such tasks could be stored as "data" and thus a new architecture was created

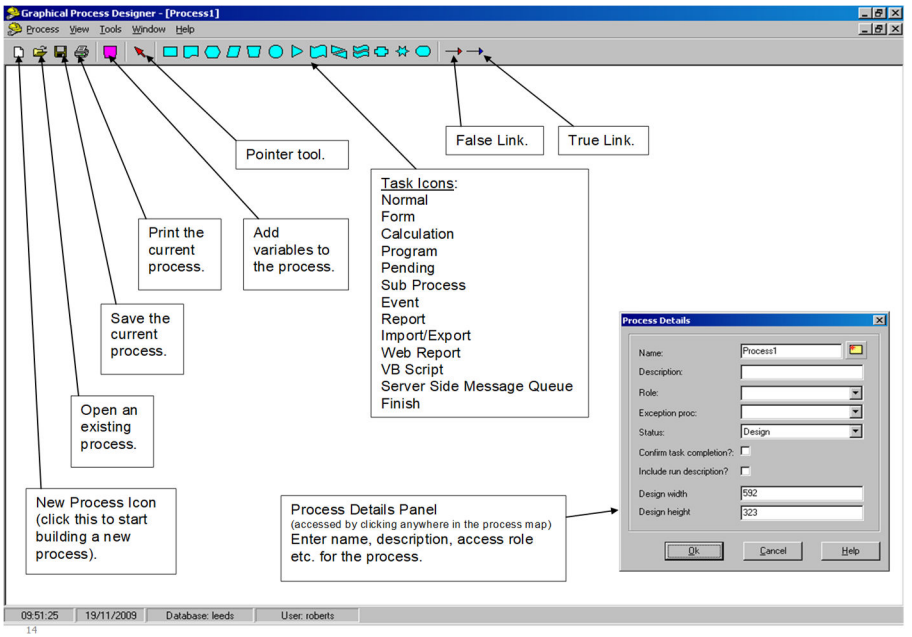
After 20+ years of research and development and working with early adopters, this approach has achieved the objectives set. The generic task objects and the important links were built and displayed in a Graphical Process Design Model where build of custom applications takes place with no change to the core code, and no code generation or compiling.



This core capability was built but the challenge remained how to make it easy for business to use. A user-friendly interface was built to set up the database



It was decided that a Graphical Process Designer (GPD) should be built over the core code and icons were created that mirrored established ways of mapping out work activity. It was built to allow the GPD to "declare" through to the pre-formatted database the custom requirements. This technique removed code generation and compiling allowing rapid change in build and in the future. A version control capability was added to include flexibility as to where in a process change is adopted with minimal if any interruption to the daily business.



The build graphical tool with traditional icons for types of task.

- **The Normal task** "halts" the process for an off-line activity. It is a very useful development aid in a process but should be used sparingly in a "live" environment.
- **The Form task** is the task that the user will be mostly concerned about.

  This is where data is entered into and extracted out of the database. It can be a "simple" display form or a complex interactive form. This superseded by the web report/form task below but used for quick first cut/ prototype of the application.
- **The Program task** allows you to "call" applications such as Word, Excel and specific program used in a process.
- **The Pending task** places the process into the "Pending" tray of the user concerned. This is a very useful task that is used alongside deadlines and delays in a process.
- **The Report task** enables a report to be generated via any report application based on a previously defined template.
- **The Web report/form task** is used to hold the path for Java Server Pages/forms to run across the web. Utilizes Ajax to ensure once only entry of information with intelligent grids.
- **The Calculation task** can contain calculations involving almost anything including dates, numbers and strings. As well as Procession specific calculations, SQL commands can be placed here to manipulate the database directly.
- **The Sub-process task** allows the process to move to another, or 'sub', process.
- **The Event task** bundles the same task together in multiple runs and waits for another process to action it.
- **The Web VB Script task** allows the use of Visual Basic code. This task can have many different functions according the requirement of the developer but only used in client server environments.
- **The Finish task** tells Procession that the process has ended. As far as the user is concerned, the "run" of the process will disappear from the trays. At this point, that particular run will be placed into the "Process History" tray of the manager.
- **The Import/Export task** handles the movement of "bulk" loaded data into and out of the database. It can be both completed by the user and/or the system according the specifications.
- **The Server-Side Message Queue task** handles communication between Procession (and therefore the database) and many other external systems, such as legacy systems. Its more popular use is in the sending of e-mails from inside Procession. This is a very versatile and important task.

These tasks were created as "objects" and expressed as data inside a relational database. To make all work in the required order, linking capability was incorporated. It was recognized such linking could be used to make decisions within the flow of work supporting many business rules. It was designed to assign roles as required and allow full audit trail of work to be tracked with real time feedback supporting empowerment of people at work. Direct input by users is encouraged as they can now see and understand what and how the software builds the application with change readily supported.

How Task Links work

Although these links are very powerful, they are quite easy to learn and understand. They contain much of the logic that drives a process application. They are the workflow of the application allowing rules to be built and great flexibility supporting asynchronous work. They are also supporting business rules requirements

A link can be thought of, in its simplest form, as a bridge between two or more tasks. There always has to be at least one *Source* task and at least one *Target* task and a link spans the two. The links are creating the workflow collaboration.

There are only two types of links to remember, the True link and the False link

A link, whether True or not, is made up of a *Source* part and a *Target* part. The *Source* part includes the *Source Node* and the *Target* part includes the *Target Node* and the Red/Blue line.

The two types of nodes or link points are where other links are joined or diverged. For example, if you have two source tasks, there would need to be two links (one from each task) coming together at the *source node.* The *target node* relates to the *target task.* If there were to be two target tasks, there would be two links emanating from the *target node.*

Now we can introduce slightly more complex parts to these links to give processes more functionality. These attributes are deadlines and delays which are readily incorporated into the build. They are very useful in processes and are used a great deal.

A BUILD PLATFORM DELIVERING ALL BUSINESS REQUIREMENTS

Within a data centric architecture can deliver that "holistic" approach

The architecture managing all the tasks and of course the linking together (some call workflow?) has surprised even us as it delivered on all the technology needs of enterprise software in a single environment. This includes multiple RPA and IA opportunities with real time insights into all activity. These all emerged from the core business logic thinking supporting the needs of users with nothing off the agenda as articulated by the UK Sport user. Seems to fit the holistic requirement where the whole is greater than the sum of all its parts?

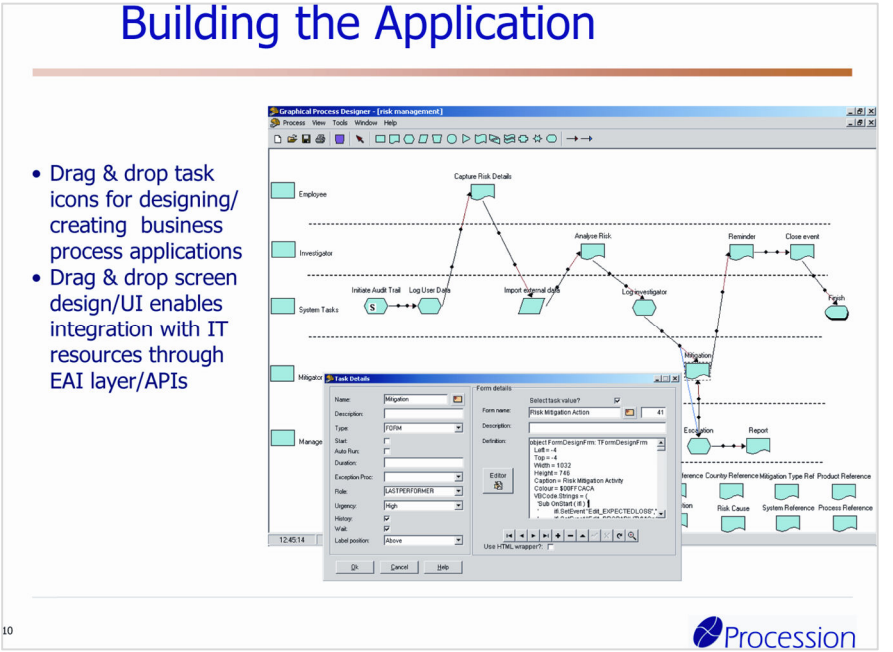
The following capabilities are inbuilt within the data centric architecture

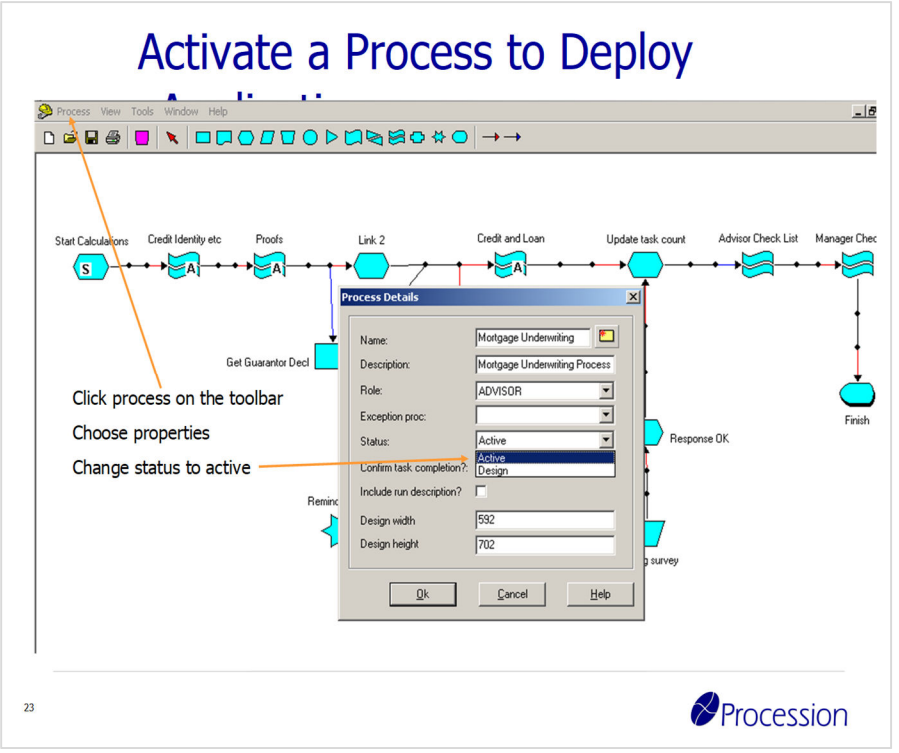
1. Process engine - to ensure all works to plan.
2. Rules engine - reflecting real world of work and compliance.
3. Calculation engine - automating system work.
4. State engine - Real time feedback from any point.
5. Workflow - everything connected in right order.
6. Audit trail, events, escalations - = control with empowerment.
7. Rapid prototyping - user involvement in build no need for a final spec
8. Time recording - supports activity-based costing.
9. Real time reporting - becomes predictive.
10. Build mash ups - one screen multiple data sources.
11. Linked intelligent Ajax grids - enter data only once.
12. Roles and performers - people and machines recognized.
13. Management hierarchy - see who does what and when to reallocate work

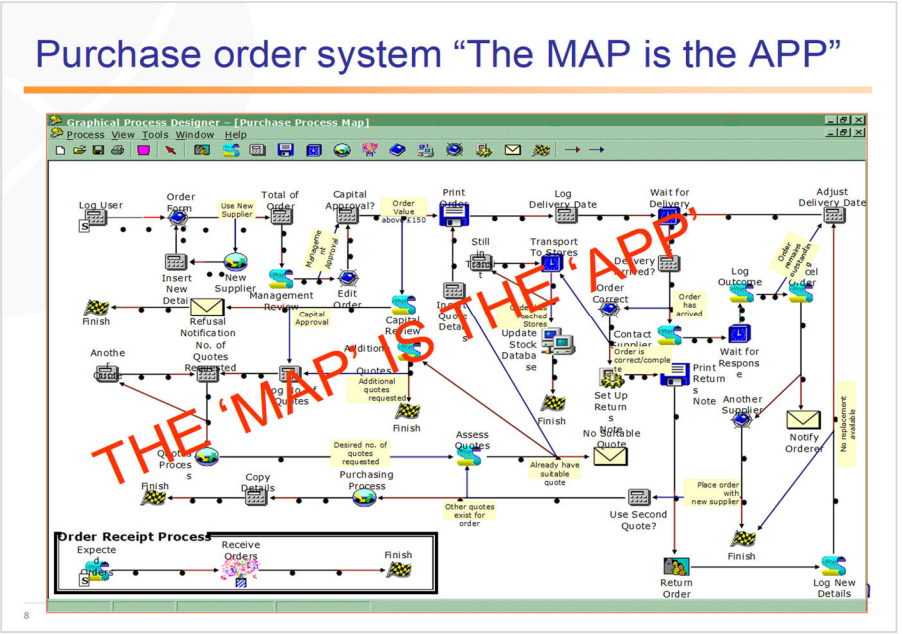
14. RPA / MDM Orchestrating legacy with business processes as required - recognition of valuable legacy data and functional systems
15. Call Web Services - wrapped up in a process.
16. User interface dynamically created linking people, roles, task type and data via forms for specific instances - supports adaptive capability
17. Content handler and in memory work capability - to ensure high performance.
18. Pre-built templates for custom documents, letters, e-mails, messages etc. dynamically populated with instance specific data and edit capability in browser - recognition of external communications documents etc.
19. Process and task versioning control – ensures minimal disruption, if any, to implementation of changes.

DESIGN, BUILD AND CLICK AUTOMATION of ACTIVATION

- By activating and saving a process
  - the Process Engine breaks down the designed process into its constituent elements
  - through a declarative technique these are saved into Oracle tables.
- At run time
  - the engine interrogates these tables to decide
  - who does what, when and how, in the application.
- No code is compiled to enable this to happen.







The visual view of a completed application using custom icons

As can be seen, it is possible to customize the icons to suit. This GPD is the deployed application and as such is the new "code".

AUTOMATION WITHIN BUSINESS PROCESSES

As can be seen there is a simple and logical horizontal flow of work which intuitively supports automation of many routine tasks and communication. This includes automation in custom creation of external communications such as letters and email.

With inbuilt rules it is possible that decisions on next actions can be automated. The inbuilt RPA and MDM readily enables the automation of links to legacy data and other systems for use as required. The Realtime feedback to all authorized user ensures both empowerment of employees and supporting both human and automated required actions. This new approach to enterprise software opens the door to new business models where tangible benefits can be gained from improved productivity and to employee and customer satisfaction.

Intelligent Automation in build creates trust

- What gets specified gets delivered – quickly – the new alternative to COTS and custom coding where all business logic pre-built ready to be configured as required
- Real time information/measurement from source supporting empowerment
- Full audit trail who did what for how long
- Rules driven that organize and enforce compliance as required
- Users engaged and views acknowledged in building improvements

Intelligent Automation Platform is a future proof investment

- Software that can change as business requirements change
- Separates business logic which never changes from constantly evolving delivery technologies (web mobile etc.)
- The core design built to cater for all eventualities in business
- Business relationship (not technology) driven
- Built in capability to orchestrate the use legacy information as required and plan program retiring old legacy

Intelligent automation delivers human interaction and knowledge management

Human-to-Human interactions in the business are the prime driver with systems supporting to supply information to the right person at the right time in the right place. There are five basic attributes that come with this intelligent automation approach to aid human creativity, collaboration and innovation delivery

1. Human Connection visibility with roles and performers, each with its own properties and responsibilities.
2. Structured connectivity to allow people to manage their interactions with others better, with clear goal directed outcomes which can involve multiple asynchronous channels, each for a different purpose.
3. Time management to support in a structured manner on or offline work that includes the mental effort people invest in researching, comparing, considering, deciding, and generally turning information into knowledge and ideas.
4. Non-Prescriptive sequencing of people's activity within structure that has flexibility for users yet retain an overall control management
5. Processes change processes - human activities are concerned often with solving problems or making something happen. Such activities routinely start in the same fashion - by establishing a way of proceeding - which methodology to use, which tools are required, which people should be

consulted, and so on. Further, this is not a one-time thing - it happens continually throughout the life of the process. This is the greatest challenge for supporting software and intelligent automation has the flexibility to start this journey evidenced allowing user's choice at run time and its unrivalled ability for rapid change.

Examples of Intelligent Process Automation

- Intelligent orchestration this ensures the right information delivered to the right person at the right time from any source
- Intelligent process which can recognize user decisions and dynamically present next appropriate steps.
- Intelligent forms entering data only once
- Intelligent coordination of all business logic requirements linking seamlessly front and back-office (process, workflow, rules, events, state etc.)
- Intelligent agility in the supporting technology for easy change making it a future proof investment supporting constant change driven by users
- Intelligent reporting real time measurement and including "social" aspect of people interaction formal or informal as required

We have been just as surprised as some early adopters in the capabilities to automate decision making with processes. With one early adopter, they recognized this approach could build both a product and pricing configurator which ensured their products were both available and priced correctly. Another recognized the ability to build an intelligent questionnaire which could dynamically produce next relevant questions based up previous answers and aiding conclusions. This is just the start of this intelligent process journey

THE FUTURE OF THIS NEW INTELLIGENT AUTOMATION JOURNEY?

Intelligent Automation from build to future proof deployed adaptive solutions must be the future as the final step in evolution in enterprise software. It has been pioneered and well-now proven but ignored for over 20 years. This simply confirms that the Intelligent Automation approach is very "disruptive" as evidenced by the UK Sport statistics.

Whilst the benefits for users are significant, the real challenge as we all know is the existing supply chain, as it has evolved, became dominated by some very large players. It is good to see many others emerge with IA. I see this as evidence that this approach will bring enterprise software into the commodity arena yet will support custom solutions and indeed encourage automation not to replace people but bring in a new era of IA-assisted jobs. It will need that holistic-supporting software to bring simplicity in build yet deliver required complexity as required for business and deliver future-proof investment for business in their enterprise software.

David Chassels is Scottish trained CA, and currently Director at Procession Technology Ltd a company focused on R&D working with early adopters in the Enterprise Software sector now ready for exploitation. He has written a number of papers about the importance of technology aligning people and their processes. Previously David was a Partner in International Accounting firm BDO and spent 20 years with ICFC/3i where he was actively involved with many early stage companies and advising on fund raising and M&A transactions. Currently David is working with a group to set up distribution of global funds allocated for humanitarian purposes with an emphasis on new water technologies and disruptive innovation.