

IT TRANSFORMATION

DEALING WITH MASS AUTOMATION

There is a recognised shift in the industry towards widespread/mass automation. Although this is not a recent concept, the technologies and techniques to realise this are now at a level of maturity that indicates the vision is now achievable.

This paper explores some high level challenges associated with the technological aspects of automation and offers techniques in order to enable the realisation of automation within organisations.

Glue Reply are a specialist in Architecture, Integration and Data with significant experience in the topic of automation. Glue Reply provides a wide range of strategy, architecture and delivery assurance activities around the realisation of automation.



BEING PREPARED FOR MASS AUTOMATION

Automation is intrinsically linked with IT technology, yet in terms of readiness for automation IT organisations find themselves often completely unprepared. The introduction of automation places some important requirements on the IT architecture of an organisation and those that have a clear response to this are the ones who can realise the vision of automation, quickly and less painfully.

The fundamentals around automation start with the context of automation. Automation will be realised at a number of levels; firstly, *simple task automation* is the lowest level of automation and the most common today. The next level is *whole process automation* which is being realised only in quite well bounded problem sets. Finally, automation becomes pervasive and the *de facto normal way of operating* and human intervention is minimal.

In order to realise automation, organisation IT architecture needs to support the evolution of automation capabilities. The first and most important is the ability to judiciously separate a number of concerns that are often tightly coupled together. These are as follows:

- **Tasks.** In many organisations the majority of tasks that could readily be automated are tightly encapsulated in IT systems, with an expectation that a user of a system will execute the tasks. Tasks may not be of an arbitrary granularity to enable automation, the granularity of tasks may need to be more dynamic than that
- **Allocation Rules.** In order to give a thing (person or technology) work, it needs to be allocated it. Whilst this might be arbitrary based on role historically, in the future this needs to be based on other task heuristics.
- **Actors.** The characterisation of actors who perform tasks. These actors could be human or be automated



TASK AUTOMATION

In order to realise automation, tasks or work needs to be separated from other concerns as far as possible. This is not trivial, because many systems assume an implementation of a task as part of their design. One of the ways of making tasks available is often via integration, hence using APIs available in the systems to externalise the task. Better still, the business process itself is externalised from the functional system, so that over time the scope of automation can be extended beyond discrete tasks.

When automating tasks, the tasks to start with are likely to be quite small and discrete. Therefore their scope might be a classic step in a business process; however, as the scope of automation extends, it may be more effective that a series of steps are automated together as a block.

In order to realise task automation one of the important steps is the ability to externalise tasks from systems through 'delaminating' the system layers and concerns. Whilst in the very early days of automation typically pure manual processes are the target, systems will rapidly become more of a target as maturity increases.

ALLOCATION RULES

Tasks need allocating to actors either discretely or as a group. The problem is that allocation is often arbitrarily driven by role. More sophistication is required for automation, and whilst some systems have the capability to do this, others do not. The allocation of work needs to be dynamic and based on the heuristics of the task. This ideally needs to be a runtime concern and can be considered a genuine use case for concepts such as dynamic discovery which was popular in the integration world in early SOA architectures. Allocation rules need to have some sophistication, the chosen actor needs to be based on a series of capability and constraint contexts about the actors and equally the nature of the tasks. In automation, it is possible that different robots perform the same tasks and that they are increasingly specialised on the specific context. To follow that pattern the task characteristics need to be analysed to ensure the correct robot or human is allocated to the task, and it is not arbitrary whether it is automated or not.

Allocation must be executed in real-time, this is one of the characteristics of allocation. It should also not be dependent on the rules knowing exact actors, but instead identifying actors dynamically as well as assigning the task dynamically.

ACTORS

Actors can be human or Robots. Their characteristics must themselves be defined and potentially the bounds of their capabilities. This goes much deeper than simple roles and role-based allocation. The allocation rules need to execute in a way that the actor is selected dynamically based on the best-fit for the task and task heuristics. Defining the characteristics of an actor is complex because these characteristics makes the Actor a candidate for a number of different tasks. Therefore the actors' characteristics must depict something more generic. Conversely, the capability to automate may start very narrow, and therefore it might be initially very fine-grain tasks where automated actors can be selected.



OTHER IMPLICATIONS FOR ARCHITECTURE

The modus operandi for process automation has historically been business process management/business process automation tooling. This tooling works for many of the requirements, but it can run out of steam in some circumstances. These include:

- The **scope of automation** might be multiple steps, therefore the process automation can be partially implemented via a robot and partially a process automation tool
- Business Process tools make an assumption about deterministic behaviour. This is neither how some parts of a business work, nor how automation may need to work. Therefore the process context of automation may be dynamic. This can introduce an alternative architecture which is **Rule Chaining**. Rule Chaining is a technique whereby a series of rules defined typically in an Event-Condition-Action approach are chained together to provide the 'process'. The difference with this is that multiple classic process steps could be realised through a single action, and there is not a strict sequence of execution. The other aspect is the ability for completely different outcomes to be arrived at through the execution of the rules (and thus part of the problem of non-determinism).
- The ability to **separate tasks, allocation rules and actors** – some of the key 'ingredients' in a mass automation approach.

INTEGRATION

Integration technologies provide a key enabler for process automation, because the whole architecture of automation depends on loose coupling and in fact much looser coupling than is typically realised in normal integration architectures. The topic of separation of tasks, allocation rules and actors is one that once was considered part of a good integration architecture, but increasingly it has been forgotten. The use of dynamic discovery can provide an enabler for this type of architecture. Another consideration is the use of service-inversion design patterns to enable generic components to be configured in a specific way at runtime to achieve certain activities – this is a technique that can provide a strong enabling capability for mass automation.

API governance is also an important area for mass automation. If there are many APIs covering very similar areas it makes the introduction of automation into an organisation far more complex; equally the current style to develop APIs for a narrow channel-specific experience-centric context is counter to what is required to cohesively deal with automation.



BEING PREPARED

Within this paper a lot of the concepts and simple views of automation are provided. The realisation in any particular organisation will be a product of the maturity of the organisation towards being able to adopt automation and the IT topology that will enable or inhibit it. The industry is at a cusp of a large change and there are actually many things that are being done which fit a current generation Enterprise Architecture very well but are actually counter-productive in the realisation of mass automation.

Everyone needs to be prepared, because mass automation will revolutionise industries and change fundamentals that have been relied upon. Now is the time to have a strategy, to have a clear view on the opportunity and how to best exploit it.

GLUE REPLY

Glue Reply is the Reply Group Company specialising in IT architecture, integration and data solutions that drive business value. Pragmatic in its approach, Glue Reply provides independent advice on the technology solutions that achieve clients' business objectives. Glue Reply's core proposition is to help organisations maximise the value from their business change and technology investments by helping them define, design, implement and resource best practice. Glue Reply works with many companies as a trusted advisor as well as being known for getting stuck into the nuts and bolts of any technical challenge to ensure the desired outcome. Glue Reply's solutions drive operational excellence whilst preparing clients for digital transformation, cost reduction and data exploitation.

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