

Agentless Systems: An Architect's Perspective

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The landscape

Information Technology systems are the delivery platforms for creating, storing, exchanging and utilizing information. Today there exists a multitude of systems that provide components or entire solutions to any particular business requirement. As vendors specialize in addressing particular areas of the spectrum such as data transport, processing, storage etc., it is rather rare that any organization has purchased and deployed all required technology solutions from one IT vendor. The outcome is a composite technology landscape that becomes harder to maintain the bigger it gets.

Larger companies employ IT architecture teams that have the challenging task of building an integrated framework for evolving or maintaining existing IT systems that allow businesses to achieve their goals. Architects know too well that there is a trade-off between in-depth narrow guidelines and a too loose framework that essentially allows any technology set to be deployed if it meets a particular requirement. The challenge is compounded by the existence of legacy systems that cannot be easily updated without considerable business impact and a constantly changing technology environment where new innovative solutions promise higher efficiencies. All of the above becomes even harder when one considers the dynamics of the business itself where change is a key ingredient for competitiveness and survival.

The conclusion of the above is that most operating technology environments are diverse and dynamic. The above problem is not new and many experienced industry forums have attempted to find solutions to this problem. A common approach is to introduce industry wide technology standards in a hope that vendors and business will adopt these to provide a greater level of interoperability between varying vendor solutions. While some of these standards have been incredibly successful such as TCP/IP and many other Internet protocols, a large number has failed when attempting to bind business processes to technology sets. Each business has its own mix of legacy systems, home-grown applications and policies on standard operating environments amplifying the complexity of adopting new standards into an established environment. If one considers the lengthy lead times in standards' adoption, commonly one or two new standards have emerged by the time one has had a chance to embrace the initial one, so it is no surprise that even standard's adoption in the government sector has been at best very slow and achieved often only mediocre results. By no means should this let the reader believe that standards development and deployment is not essential, however, it should encourage the architect to be critical with what type of standards are really of benefit to the organization. At the end of the day, technology should assist businesses in achieving their goals, not vice versa. Good IT architecture will ensure that business is not hamstrung by technology but rather Information Technology will enable business to achieve its goals more efficiently.

Agent-based systems in IT integration and management

In the previous chapter we have concluded that IT infrastructures are generally diverse and dynamic. IT architectures need to embrace change and should not create unnecessary technology lock-ins for extended periods of time. But how does this relate to agentless system architectures?

Before examining agentless system solutions let us first have a look at their counterpart, namely agent-based solutions.

In the context of IT infrastructure integration and management, agent-based solutions require that software modules are rolled out across the technology infrastructure for the purpose of data exchange or data collection between non-homogeneous systems. These software modules (agents) are tailored to the underlying systems and apart from their intrinsic capabilities, introduce a realm of implementation and support overheads during the life-time of their deployment. The significant amount of effort and cost associated with the roll-out of agent-based solution often leads to proprietary technology lock-ins over many years. Some of the implementation challenges of agent-based solutions are caused by varying degrees of customization requirements of agent modules, sociability testing of agent versions, agent dependencies on particular operating system libraries or application versions and simply the enterprise wide roll-out itself. Problems are often amplified when data collection or system integration is required from or across legacy systems. We have already highlighted that agents are usually dependent on particular subsystem versions, however, in the case of in-house developed applications or legacy systems there is often simply no agent available that can access the relevant underlying system information. In these cases, scripting or programming and compile efforts are required that often can only be performed by specialist consultants.

Additionally, there are hidden implications in the areas of security threads and network overheads. Many agent-based solutions rely on RPC (remote procedure call) techniques opening up dynamic ports on host systems that can make these systems vulnerable to exploitation and denial-of-service attacks. In addition, some agent-based solutions utilize many TCP connections for the communication with other agents or central agent management systems, therefore requiring multiple holes to be punctured into firewalls or access lists in network devices to be diluted.

Due to the overall effort encountered in the deployment of agent-based systems these agent systems can become legacy systems in their own right. Changes to the underlying infrastructure such as new OS releases, security updates, application add-ons or changes can become dependent on the availability of suitable agents, stopping the technology refresh in its tracks.

Agentless system architectures

Agentless system architectures aim at resolving the issues concerning agent-based systems. They have the benefit of not being prescriptive or limiting in what technology updates can be undertaken. Agentless solutions do not favour any particular standard or technology set and do not impose significant

change to the usually crowded technology platforms.

So how do agentless solutions work?

The premise is that all information necessary to integrate or manage technology systems is already embedded in the system itself. For example, the performance of a database can be deduced from the operating system that assigns CPU, memory, IO etc. to the operating system processes that make up the execution code of the database application, as well as from an interaction with the database itself. By accessing the database application one is provided with detailed information on application statistics and performance metrics. By nature of the database, the administrator can access this information from any location in the network via direct or indirect methods (i.e. SQL queries over the network or terminal access to host). Other applications may store the required data in log files or provide dedicated services for access, however, in a network environment there is always one or more ways to access the embedded information. This is exactly what differentiates agentless solutions from their counterparts. Rather than adding an additional layer to the managed system i.e. agents, agentless systems make use of existing services to access the relevant system information. The benefit is that any system component can change or be replaced without agent restrictions. Restraints such as sociability or security matters are reduced when agent systems are replaced with agentless architectures.

So why use agents at all? While logging on to a system, executing appropriate system commands and retrieving and correlating pieces of information may be simple for systems administrators (depending on experience and skill set) but may not be trivial for an automated system. Until recently, this challenge was perceived to be difficult and hence a lot of solution vendors relied on the use of proprietary agents that could be deployed for systems for which agents had been developed. While a number of agent-based system vendors have improved their agents to be more flexible, the underlying fact remains that they introduce an additional layer of overhead to IT infrastructures.

Well architected agentless system solutions have overcome the data access problem with intelligent and easy to use data parsing (analysis and extraction) facilities. In other words, true agentless solutions can in principle access data from any system or application in the same manner as the appropriate system expert could. This becomes a major advantage when one considers data extraction from home-grown applications and legacy systems for which no agents are readily available.

Conclusion

Agentless system solutions can considerably outweigh agent-based systems particularly in diverse and distributed IT infrastructures. They can extract data from systems that agent-based solutions have great difficulties with e.g. non-standard systems, and in general have considerably lower implementation and maintenance overheads.

It should be mentioned that agentless capabilities are only one pillar of sound system's architecture. In the management space the ability to collect data from all infrastructure systems is only useful as long as the data can be

correlated and expressed in the context of business and/or technology delivery systems. In the integration space extracting and uploading of data to disparate systems is also of limited use unless data transformation and business rules can be applied in the overall data exchange process.

Nevertheless, agentless solutions have numerous advantages over their agent-based counterparts that should be considered carefully when evaluating the most appropriate solution for the organization.

About the author

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