Architecture Evolution

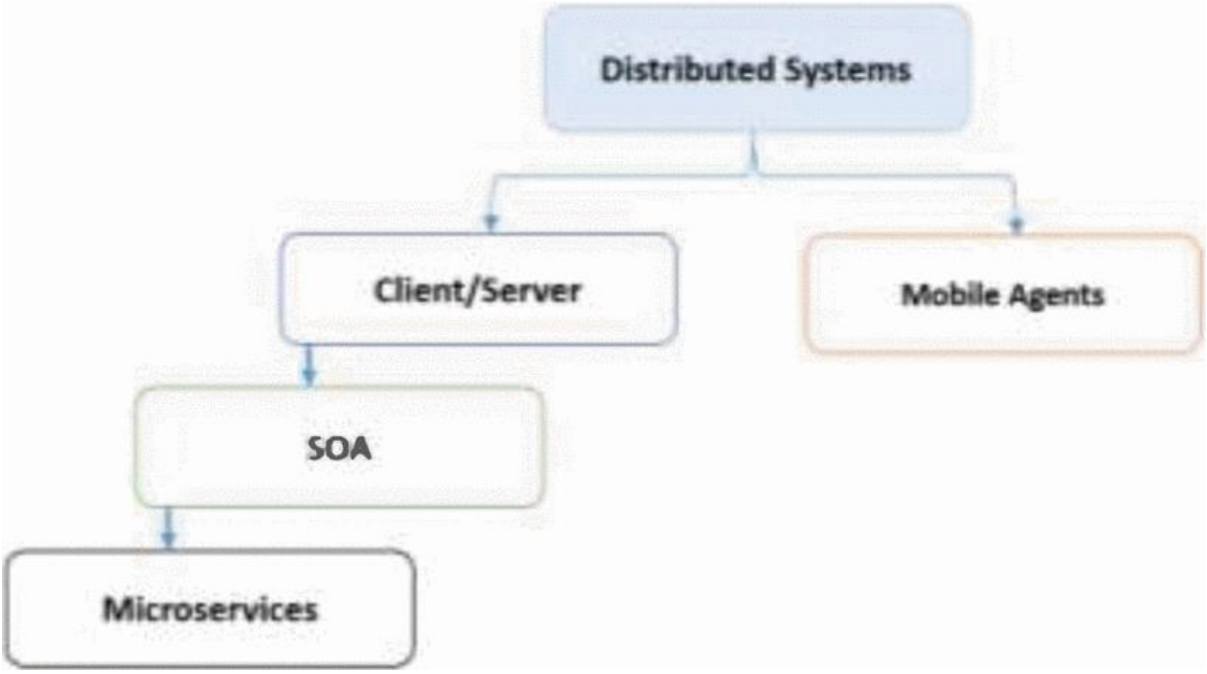

Figure 1 Distributed systems taxonomy evolution representing architectures (Salah et al. 2016)

In referencing the article written by Salah et al. (2016), the following section is proposed when considering the evolution of distributed architectures that leverage current technologies.

SECTION IX.

Addendum: Architecture Evolution – Globalised, On-Demand Function Services.

The world's consumption and generation of information will continue to grow, making the role of software engineers increasingly important. The evolution from client-server to today's architecture of microservices is an evolution from large to small. Code cannot get any smaller than the smaller unit of functionality, namely a "function": a highly focused line of code capable of taking a single input and producing one or more outputs.

The proposal of a globalised list of on-demand function services builds on top of the microservice paradigm concept. It ensures that single blocks of functions are created on-demand to service the needs of consumers. Allowing on-demand generation of service functions is handled by existing cloud infrastructure with the potential for transparent load balancing across other cloud providers.

The idea behind on-demand function services is to leverage artificial intelligence engines that understand the function exposed by every type of modern-day object and (conceptual) data, whether a “shopping cart” or a “bamboo stick”. Knowing the functions permitted on each object, the AI models can automatically generate appropriate “functions” which information systems may leverage when presented with such items. The global nature of on-demand function services permits information systems to act both as mobile agents and localised client-servers. This is because information systems no longer require the development of proprietary business functions to operate on proprietary data objects but rather request functions from a global repository of object functions for known real-world data items. For instance, a data object that represents a “soda can” within a supermarket chain has various “functions” applicable to it, such as “open”, “crumple”, “associate barcode”, “pack” or “weigh”. Each function itself has required inputs— “open”, for instance, requires a source data object capable of fulfilling the requirements of “pull tab”, an action applicable not only to soda cans but also to ticket machines or even a software system’s representation of a “notebook”.

AI systems’ knowledge of real-world objects may initially be seen as an impossible task, given the consumeristic nature of modern society with a never-ending plethora of “junk” produced. However, even as information systems are breaking down the language barriers between cultures, so too they will be leveraged to “refactor” business object definitions into a common business vocabulary, as seen by the efforts of the National Information Exchange Model (Hanegraaf & De Bruycker, 2020), the development of Health Information Exchange (Yewande et al. 2020) or the development of a common model for law enforcement (Kozik et al., 2020). Driven by the need to define a common language or definition of information system objects, it stands to reason then that AI can be leveraged to dynamically, and in realtime, build electronic representation of data with functions capable of processing those exact objects. If falls then to each organisation’s own processes to determine how the output from such functions will be stored or processed in their business.

Microservices are the foundation for the next evolution, in a world where information systems are connected 24-7. Such connectivity will inevitably bring with it the need for

interoperability. Redundancies will be addressed with common vocabulary, and the need for rapid release and feature developments could be facilitated through the use of dynamic AI models capable of generating ad hoc microservice-style functions (and services).

References

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