
Whose **OPINION?**

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Nig has worked in the IT industry for over 35 years and has concentrated on solutions for central and local government since 1985. He is active in the industry standards area having worked on the UK's e-Government Interoperability Framework since its inception and represents Fujitsu on a number of government and industry forums. In his spare time he enjoys playing guitar (although his family are less enthusiastic) and playing five-card crib.

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YOUR OPINION

Nig would welcome your comments by email (nig.greenaway@uk.fujitsu.com) or at uk.fujitsu.com/opinion



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Infrastructure as a **SERVICE**

More efficient, cheaper infrastructure that can be better controlled and managed

Providing infrastructure as a catalogue of services attacks expensive duplication and complexity in your technology base, cuts the time to deploy new or changed business processes and drives down costs. The approach is well-proven at the applications level and is readily applicable to infrastructure. New management disciplines will be needed, of course, as well as a greater sense of joint purpose between business and IT. It's our opinion, however, that the potential for reduced cost and complexity and the improved provisioning of new services demand that we adopt service orientation for infrastructure (SOfI).

Nig Greenaway

SERVICE ORIENTATION FOR INFRASTRUCTURE

The concept of service oriented architecture (SOA)¹ comes from the software application domain, but it can be applied to great business advantage in other areas too. When it's used with infrastructure, the service oriented approach can generate sustained benefits in agility, quality, maintainability and cost. With the lion's share of project capital costs swallowed by infrastructure, the time is long overdue to evolve the way we fund, access and consume infrastructure resources. But just as traditional SOA demands a change in mindset, so does what we're terming SOfI – service orientation for infrastructure.

SOA yields its benefits by making software available as a series of loosely-coupled IT services that can be composed to provide business services. This approach contrasts with the traditional application model where an application encapsulates all the functionality needed to provide a single service. The older model inevitably leads to duplication of function. In addition, any fundamental business changes have to be implemented in all applications. By contrast, the SOA model limits such changes to a very small number of services – ideally only one.

Today's technology infrastructure increasingly needs to be resilient, highly available and scalable. These requirements have led to 'application silos' where each application is supported by its own dedicated infrastructure sized for the maximum workload, such as a seasonal peak. Organisations end up operating large IT estates with average CPU utilisations of only 10–20%. That's very expensive slack.

¹"The policies, practices, frameworks that enable application functionality to be provided as sets of services published at a granularity relevant to the service consumer that can be invoked, published and discovered, which are abstracted away from the implementation by using a single, standards-based form of interface." The Component Based Development Forum (CBDF)

IT'S OUR OPINION... INFRASTRUCTURE

Furthermore, each application's infrastructure is separately architected and built – often with little consistency between architectures delivering similar functionality. The resultant diversity adds to the estate's complexity and the costs of management, maintenance, upgrade and technology refresh.

Technologies such as virtualisation are starting to address some of these issues. Such approaches enable an integrated approach to infrastructure and introduce mechanisms for sharing particular sets of resources. However, this is a technical approach rather than a business-oriented one: it can only be effectively applied by skilled IT staff.

CONSULT THE CATALOGUE

The consumers of services need to understand the services offered and how to invoke them, as well as any constraints, costs and quality characteristics. These attributes can be communicated by means of service descriptions provided in a business catalogue. The catalogue brings new discipline to the creation and exploitation of services, reducing proliferation and making the value of the organisation's services more visible. There's also a greater degree of accountability on the part of consumers, and clarity on the part of providers.

The catalogue approach provides an external view of services described in business rather than technical terms. This leads to a separation of concerns. The service provider is solely responsible for the service implementation and managing it to ensure the advertised level of service. Consumers can use the service (within any identified constraints) without concerning themselves with detail outside of their sphere of control.

We call this approach *service orientation for infrastructure* (SO_{FI}) and define it as 'a means of organising and using distributed infrastructure capabilities to reduce the effort and cost of infrastructure provision'.

The application of SO_{FI} is not limited to platforms – which is the scope of most people's idea of infrastructure. SO_{FI} can also be applied to any service intended to provide economies of scale and not limited to use by a single business area. Common services such as output handling, middleware, tooling, operational management, discovery, architectural patterns and charging mechanisms all fall within this scope.

By their very nature, these services will be consumed by different customers. Some will be used by the business for clearly recognised business outcomes; paper output handling is one example. Other services will be indirectly used via an intermediary such as an application or business service developer. An example from this category would be an enterprise service bus (ESB) that allows applications and services to be distributed across a network.

Communicating with these different types of customer and pricing services sensitively are particular challenges for the managers of the business catalogue but the value of the catalogue as an enabler and accelerator of business goals more than justifies the investment.

WHAT MUST CHANGE

The customer selects items from a catalogue. This stops endless re-invention.

Strategy architects identify and define new services. These should be based upon (repeated) requirements from the customer. They also need to evolve existing services as requirements change and limitations become clear.

Infrastructure architects use standard processes to map business requirements to service implementations. This saves their time and frees them up to concentrate on the truly unique aspects of a solution. If they find themselves doing the same 'unique' thing in different projects, this should be highlighted for inclusion in a standard service.

Services staff monitor the services. Capacity and systems management must be built into all services and the results be continuously available. This enables trends to be identified and corrective action to be taken before service issues occur. It also facilitates the exploitation of services by new applications (eg. it will be clear whether or not new infrastructure is required to support the additional load that they will introduce).

All stakeholders need to identify, record and feed back any issues and new service requirements within a governance process that ensures the services and catalogues are maintained.

THE CHALLENGES

SOfl does introduce new process challenges, such as ensuring that different invocations of a service don't clash with each other. Addressing these implications requires built-in capacity and performance management, tooling and processes. Usage peaks need to be considered especially where those for different business areas can coincide. The services need to be managed appropriately, that is to ISO 20000/ IT Infrastructure Library (ITIL) standards. We believe that SOfl fits in well with an ITIL approach to the delivery of IT services.

Providing infrastructure as services has organisational and funding implications as well as technical implications. The traditional silo model of application provision is simple: a part of the business has full ownership of all components that it uses. Adopting a SOfl approach means that funding has to be at the level of the service. This means that either each part of the business is charged for the parts that it uses, or an enterprise-wide funding model is put in place.

Strategic funding is also required to establish the enabling components and framework. Obtaining this funding can be particularly difficult when the necessary service components do not directly provide business services. Once again, an ESB is an example of this: it is an essential SOA enabler but only provides quantifiable business benefits at the enterprise level. In such circumstances a strategic investment needs to be made to put the common enabling components in place. Ultimately, usage charging mechanisms will provide the required accuracy and fairness. The need to ensure that there is adequate capacity to meet expected workloads does require a business forecasting accuracy that has often proved to be difficult or even impossible in the past. Organisations need to find common commitment to shared benefits that may only be fully realised several years down the line.

A SOfl approach also means that support teams need to be aligned with services rather than with applications or business areas. Service supply and support models provide the basis for a portfolio management² approach, federated across the services. Managing the risks within each service, with accountability and responsibility vested in named individuals and teams, improves the reliability of each service. But an overarching governance structure is also needed to ensure that the collection of services provides a holistic response to the business, service/ systems management and technical needs of the organisation.

²The UK Office of Government Commerce (OGC) defines portfolio management as "a corporate, strategic level process for co-ordinating successful delivery across an organisation's entire set of programmes and projects"

THE BOTTOM LINE

Adopting SOFI is no trivial matter but the prizes of reduced cost and complexity in the infrastructure domain and the potential for improved provisioning of new services are so great that the opportunity to provide infrastructure as a set of services must be grasped. Consolidated provision of infrastructure coupled with effective service management will reduce both capital and operational expenditure by sharing available capacity and removing duplication.

This new approach will require changes in both the culture of the organisation and the behaviour of business users, commercial staff, application designers and developers, infrastructure architects and services staff. These behavioural changes require high quality business leadership, a holistic service vision and effective governance processes. Investment and funding of common infrastructure services must be defined, agreed and understood by all stakeholders.

Adapting the principles of SOA to infrastructure offers organisations a way to rejuvenate their technology management discipline, and the opportunity to rebuild relationships between the business and IT around maximum exploitation of the organisation's resources. It's the best way to reduce waste, strip out complexity and speed the delivery of your business goals.

FURTHER READING

Understanding SOA – Back to Basics with Service Oriented Architecture, David Sprott & Lawrence Wilkes. CBDJ Journal November 2003.

Reference Model for Service Oriented Architecture 1.0, OASIS Standard, published 12/10/2006.

SOA Overview and Guide to SOA Research, Roy W.Schulte & Charles Abrams. A Gartner Research Paper (ID Number G00144894) published 15/12/2006.

Learn the Key Success Factors for SOA Deployments, Michael Barnes & Paolo Malinverno. A Gartner Research Paper (ID Number G00130331) published 11/10/2005.