Application Suitability for Cloud Hosting

Part 5 of 8 – Application Hosting and Cloud Strategy

SIEMENS

This is part 5 of an introductory series of documents intended to assist your organisation in defining your Application Hosting and Cloud Strategy. Your organisation may already have such a strategy, in which case these documents will hopefully confirm you are on the right track or they may identify challenges your organisation faces.

Application Suitability for Cloud Hosting

From a bottom-up perspective your organisation may need to develop its approach to existing application migration. Although many applications could operate within a cloud environment it is likely that some remediation will be required for them to function correctly.

Public Cloud Migration Options

For each of the target models described in the previous section there is an associated migration approach.

- **Re-Host**: This is often referred to as "lift & shift" and is typically used where the end-goal is to shut down or scale down on-premise data centres. It involves picking up all the VMs in an environment and migrating them as-is into equivalent Public Cloud compute services.

  Re-hosting is not considered a viable option for an organisation if the principle above which states no IaaS Only but also because the on-premise environment is not optimised and therefore moving existing VMs to the cloud would just drive up costs. There is also a high % of physical servers in the current estate.

- **Re-Platform**: This approach involves more in depth analysis of the on-premise deployed applications to understand how the application could be deployed more efficiently in Public Cloud. This often involves some re-design and potential "de-coupling" of tiers but does have the advantage of a more cost effective and efficient deployment that leverages PaaS services. Essentially this approach "tidies up" application deployment models but is more effort than a simple re-host.

  Re-platforming may generate some headroom within the on-premise environment which will help reduce investment in infrastructure platform replacement projects, reducing CapEx and helping to balance the OpEx/CapEx trade-off. Since the business application would be the same, the level of business change can be kept to a minimum (mostly re-testing and acceptance). The next section will look at a high level analysis of applications that has been used to identify potential candidates.

- **Re-Purchase**: This approach simply looks to replace existing on-premise applications with a SaaS equivalent, which in some cases may involve migrating to a different solution/vendor. Where a change in solution/vendor is required this will drive more complex business change, procurement, requirements development and data migration activities so is significant effort.

  Where there is little appetite to absorb large scale business changes that would be required to move every possible application to SaaS a pragmatic approach is recommended, however an opportunistic approach can also work. This approach would entail applications being gradually moved as they are touched by replacement programmes, major upgrades or as new business requirements drive replacements.

- **Re-Architect**: This approach looks to "de-couple" existing applications into component parts which can then be deployed as containerised microservices and PaaS services in the Public Cloud. Re-use of common services and data repositories already built would also be considered. This is a very involved process and requires a thorough and detailed top down architectural design.

  As with Re-Purchase a pragmatic approach may be required due to business impact. Architectural planning also needs to reach a level of maturity before this approach can be considered (see Cloud Native section later in this document). As above an opportunistic approach may be preferred.

Roadmap Item	Your organisation will not look to proactively replace remaining on-premise applications (those that are not suitable for Public Cloud deployment) but where there is a business need to replace or develop an existing application the new deployment models will be considered.

Candidates for re-platforming

There are a number of factors that could constrain the re-platforming of existing applications into Private or Public Cloud:

- How well database, application and presentation tiers are decoupled (i.e. do not rely on shared components);
- How close to best practice & standardised configuration each of the tiers are;
- Whether these tiers are already deployed on separate and virtualised servers;
- Whether the technology that each of the tiers are deployed on are mainstream (as opposed to bespoke or customised);
- Whether the communication or protocols used between tiers are standardised and not bespoke or customised;
- How "open" and standardised integration is;
- Whether applications have edge computing components that for latency reasons need to be in proximity to backend components.

The following diagram details 8 deployment patterns currently in use and their suitability for re-platforming:

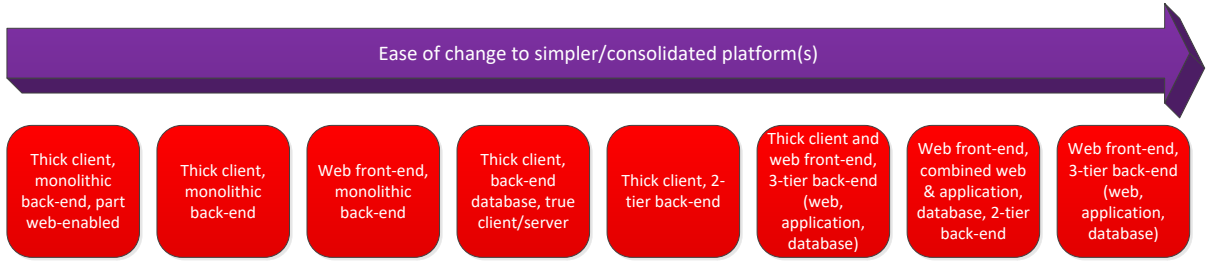

Figure 1 - Suitability for re-platforming of each deployment pattern

Migration approaches can be grouped into 5 groups, based on 2 main variables; whether the application would require transformation in order to be re-platformed in Public Cloud and whether the infrastructure the application is hosted on needs remediation. The 5 groups:

1. **Tertiary transformation candidates**: Applications on up to date platforms but difficult to migrate based on architecture.

   Approach: Leave on-premise and assess opportunities for migration against application roadmap or when infrastructure components go EOL.

2. **Secondary migration candidates**: Applications on up-to-date platforms, easier to migrate based on architecture.

   Approach: Assess these as they may provide good early adopter candidates depending on business risk and other potential constraints.

3. **Secondary transformation candidates**: Applications with EOL components, difficult to migrate based on architecture.

   Approach: Assess the scale of remediation required to bring the infrastructure components into support (this may involve application layer upgrades), if this is broadly comparable to the effort and cost to re-platform then re-platforming will be preferred provided other constraints are not present.

4. **Primary transformation candidates**: Applications with EOL components, limited migration options due to architecture.

   Approach: Assess the scale of remediation required to bring the infrastructure components into support (this may involve application layer upgrades), if this is broadly comparable to the effort and cost to re-platform then re-platforming will be preferred provided other constraints are not present.

5. **Primary migration candidates**: Applications with EOL components and architectures that lend themselves to cloud deployment.

   Approach: Aim to pro-actively re-platform as these applications will need to be touched to upgrade infrastructure components.

Principles	Whenever an application requires remediation to address infrastructure component obsolescence, re-platform cloud migration options will be considered alongside in-situ on-premise remediation. Where effort is comparable cloud deployment will be preferred.
	Deployment patterns (or reference architectures) for applications will be developed and will form part of the design governance process, these will cover Private Cloud, Public Cloud and Cloud Native models.
	An on-premise testing facility will be required for the foreseeable future to accommodate pre-production environments for on-premise applications and to provide end-user and edge device presence.
Roadmap Items	Conduct a full in-depth application deployment analysis to identify and ratify candidates for cloud migration and help inform application roadmaps.
	Reduce the on-premise server count in order to scale down infrastructure replacement investment.

Adoption of Cloud Native Solutions

The development of cloud native solutions is a step change from traditional application deployment. In the traditional model a specific business need is addressed by finding an off-the-shelf application that is the best fit with requirements. Applications are then configured or in some cases customised for the business context and then lifecycle managed through functional upgrades and patching. Cloud native solutions are essentially a set of loosely coupled services, built on off-the-shelf PaaS components or specifically coded containerised microservices. Each new capability may draw on existing common services or build new ones by virtue of this loose coupling.

The diagram below shows the types of PaaS services that would be consumed as part of Cloud Native solutions alongside the PaaS services associated with the IaaS & PaaS application hosting discussed earlier. Applications deployed in this way are synonymous with the "Cloud Enabled" definition.

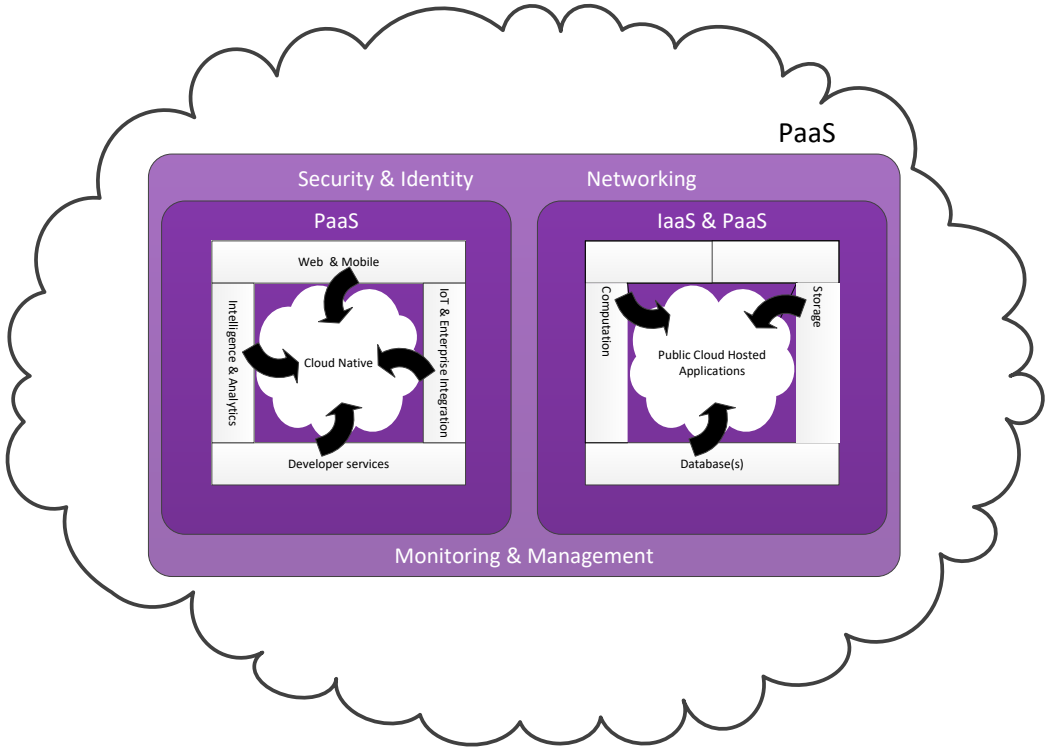

Figure 2 - Comparison of consumed services for both Cloud Native and Public Cloud

This shifts the focus of developing roadmaps from planning application succession and consolidation to the more granular level of defining reference architectures (for the consumption of PaaS services) and defining the appropriate set of services, many of which should be common and re-usable. This requires more careful linking between business capabilities (in an Enterprise Architecture sense) and the underlying services required to operate them. A lot more emphasis on design governance, reference architectures and deployment patterns is also required to ensure the solutions are not silo'ed or duplicate capability. The creation of a suite of common services to maximise the benefits of cloud computing requires a considerable amount of effort. This effort will, however, ultimately lead to a much more flexible and agile set of services with a lower ongoing cost base.

It is beyond the scope of this strategy to define the approach and methodology used to support the development of cloud native services but at a high level some basic design principles should be considered:

- Build common services for re-use that, where possible, do not involve proprietary elements;
- Maximise the re-use of existing common services;
- Minimise the amount of bespoke coding used within solutions;
- Consume off the shelf PaaS services wherever available;
- Utilise SaaS if PaaS services will require considerable customisation.

Principles	Common services to be used by cloud-native applications will be defined and governed through the CTO.
	Principles and reference architectures will govern the creation of new cloud-native services.
Roadmap Items	Design a strategic set of common services for use with cloud-native solutions.
	Develop reference architectures for use with cloud-native solutions.

Cloud Deployment Strategy

This section covers the factors that will be considered when deploying new services and solutions. The three viable Public Cloud deployment models will be considered alongside Private Cloud deployment. The following section will then cover the options and the desired approach for building a Private Cloud environment.

Key considerations

Applying the principles established so far it is reasonable to articulate the following order of preference for deployment of any new solution:

1. SaaS deployment or Cloud Native deployment in Azure;
2. IaaS+PaaS application hosting in Azure;
3. IaaS application hosting in Private Cloud;

4. Traditional legacy virtual or physical deployment.

The following table details some of the potential requirements that need to be considered when deciding on which deployment model a solution should be deployed on.

Requirement	Description
Master Data	If a new solution is not intended to be the source of new master data then the default should be to re-use existing data rather than replicating this data through application to application integrations. Cloud native solutions may be more appropriate where existing extracted data can be used.
Business Logic	If a solution requires complex and specialised business logic associated with a particular business function then it is probably impractical to attempt to build this in a Cloud Native solution, especially if there are well established SaaS solutions available. Solutions that involve basic business logic may be better suited to Cloud Native deployment.
Common Services	As more common services are built in the Public Cloud such as Azure, AWS, IBM Cloud etc, the extent to which a new solution will need to consume those common services will be a factor on where the solution is hosted.
Integration	In some cases where latency is critical to performance or data volumes are particularly high, the integrations a solution requires to other systems becomes a factor. This may tie some solutions back to on-premise if they require very low latency integration with another retained application. Another factor is the method of integration, bespoke methods of integration may be more difficult to deploy in cloud native models as these rely on standardised methods of integration.
End Users	If the consumers of a given solution are extended to partners, suppliers, 3rd parties etc then Private Cloud deployment becomes less desirable if: • The organisation intends to use federation via IDaaS on its Public Cloud as an alternative to managing identities; • Any exposure of internally hosted services requires additional components and complexity in the DMZ.
Edge Devices	This is relevant for solutions that require integration with edge devices, e.g. security systems, biometrics, CCTV, PLCs, and increasingly IoT devices. The presence or absence of a suitable aggregation layer will drive whether a solution can be deployed at distance or in close proximity.
Criticality	It is prudent to build confidence in Public Cloud services and your organisation's capability to manage them effectively with non-critical services first.
Business Change	Given the "evergreen" nature of cloud services (where there is no control over the changes and releases that may impact business solutions) the ability for a given business area to absorb changes (which could be anything from re-testing to deprecated functionality) is an important factor. Those areas that are not geared up to absorb regular change are not ideal for the "evergreen" Public Cloud models.

Decision Matrix

All of the above factors have a bearing on the appropriate deployment model for a new service so a decision matrix can been developed to aid selection. This is not intended to generate a de-facto answer; it is intended to be a useful tool to use alongside the principles established in this strategy to aid decision making. It is based on a simple scoring method that will generate a +/- preference for each deployment model.

Principles	Your organisation will retain the most critical systems on-premise for the medium term while confidence in Public Cloud deployments (and your organisation's experience of managing them) is built.
	Your organisation will continue to segregate the most critical on-premise systems from non-critical systems to facilitate change and protect critical systems from unexpected issues originating from non-critical changes.
	A decision matrix will be used to aid selecting the most appropriate hosting location for an application or solution, this will consider the 8 key variables defined in the Application Hosting & Cloud strategy.

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