EPBR Service Assessment

MHCLG
31 March 2018
Viewdeck

Assessment on a Page: Key topics from MHCLG

Lessons Learned from current EBPR:

- Avoid over-provisioning resulting from MHCLG ownership of assets vs Provider liability for Service Levels (e.g. Service Credits)
- Ensure documentation always coherent and up to date
- Ensure software variations (e.g. Dom/Non-Dom x E&W/NI) are simplified through configuration of common code, not branching.
- Avoid dependence on embedded proprietary software
- Ensure architecture is fit-for-purpose and no more

Different next time:

- Ensure SLAs and NFRs are granular, justified and finely tuned
- MHCLG to become 'technology agnostic', ideally procure 'Business as a Service' (BaaS), if not 'Platform as a Service' (PaaS)
- Consider 'Software as a Service' (SaaS) but only if clear & certain programme of change arises from policy and regulation
- Ensure providers have transparent parametric estimating models (cost/timescales) for emergent/unpredictable change
- Adopt industry-standard practices for all Service Qualities & Capacity Management
- Prescribe measures to ensure portability of Data

Lifespan extension measures available:

- Infrastructure Components high risk from 2019 (Servers, VMWare, Switches)
- Platform (e.g. Database) and Application tiers low risk
- Extension requires replacement of Infrastructure Components
- More detailed risk assessment could reveal that degradation is tolerable
- Avoid destabilising by introducing change
- Lifespan is mainly an economic decision - needs pricing from suppliers

Migration to alternative Service Provider:

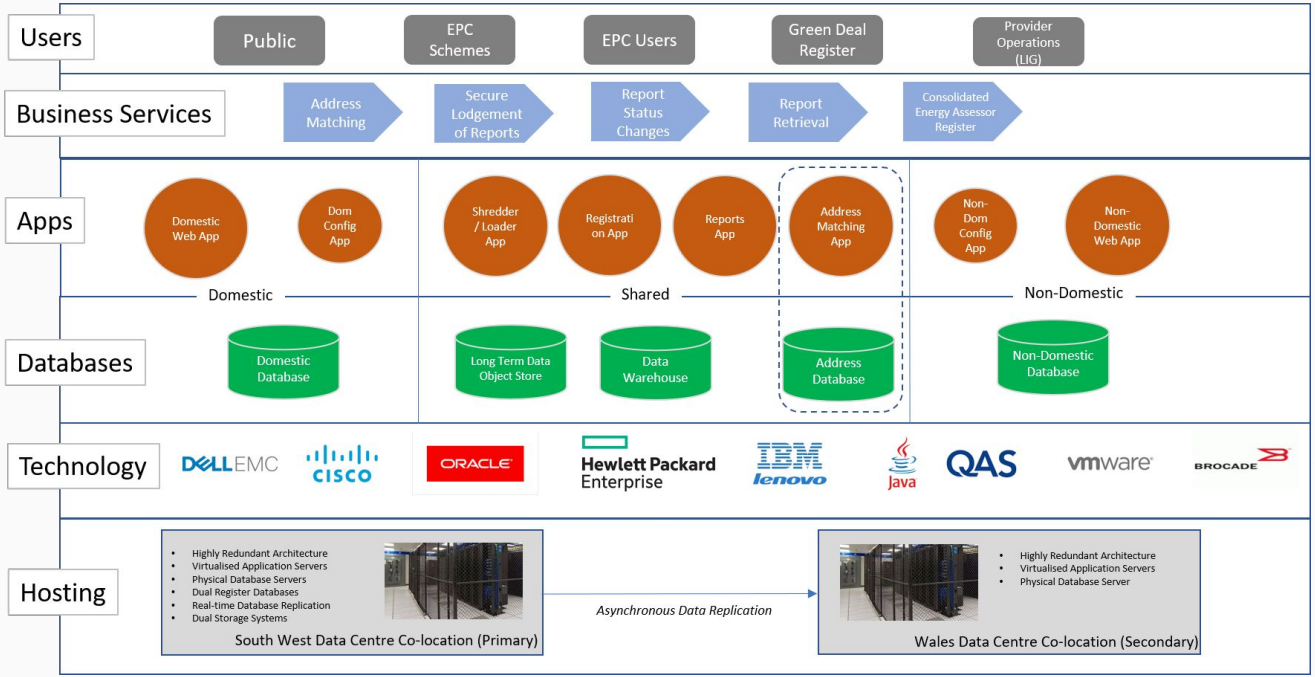
- Depends on competitive pricing, risk and attractiveness to market
- Minimum viable enablers are: replace LIG owned development and support tools, and shared inter Data Centre network connection
- Only consider as a stepping-stone in a longer-term programme
- Risk of small # of LIG staff carrying the deep knowledge

Service Level Adjustments for 2019/20:

- Contracted levels well below user expectations
- Requirement & Solution for 'Zero Data Loss' is overengineered
- Delivered levels well in excess of contracted levels
- Permit natural reduction in availability as Technical Capability degrades
- Reduce unnecessary 24x7 3rd party support
- Costs already sunk - avoid risk of deliberate removal of Technical Capability

System & Service Specification - EPBR ‘On a Page’

➢ *A synthesis of system related information gathered from MHCLG and Landmark during discovery activities.*



Unauthenticated public users, registered/authenticated users and programmatic interfaces.

Consistent set of business services spanning Register and Regulatory types.

User needs and business services satisfied via a set of applications, some aligned to specific Registers and some shared.

Data managed through the application is supported by a number of databases, some Register specific and some shared.

Implemented on a range of ‘high-end’, commercial technology together with some Open Source software.

Two geographically separated Data Centre colocation facilities. Highly resilient, dedicated configuration.

System & Service Specification – Key Observations

	Observation
SOB01	Moderately complex software and data models, driven by variations in regulatory base. Some commonality abstracted but generally distinct code bases per register.
SOB02/03	Software delivery utilises some agile practices, constrained to 'waterfall' by the regulatory and industry engagement cycle.
SOB04	Technology based primarily on high-end, premium priced products 'of the day' when system originally designed.
SOB06	Security stance and controls implemented are broadly commensurate with an OFFICIAL data classification. This needs to be formalised prior to procurement.
SOB07	System documentation fragmented and incomplete, not satisfactory for service procurement and/or transition.
SOB08	Storage capacity over-provisioned in context of service level requirements, hence capacity for growth without further investment over system 'twilight' period.
SOB09	Platform generally refreshed in step with typical industry benchmarks, though database servers, SAN switches and the virtualisation platform are at or are approaching end of life..
SOB10	Register Application Java apps are portable. Potentially significant rework required for Oracle Stored procedures and Oracle APEX configuration applications.
SOB11	Data volumes are significant, in order of 60 Terabytes. Whilst not large in wider industry terms, some careful consideration of transfer options is required prior to any service migration.
SOB12	Data models and types follow industry standards. Structures and relationships are moderately complex hence thorough planning and rehearsals for migration.
SOB13	Overall architecture is mature and stable, technology has been refreshed without changing the basic architectural structure, hence potentially disruptive if changes were made.
SOB14	Impact of change due to use of Landmark owned service management and operational tools. Precise contractual obligations on Landmark needs to be determined.
SOB16	Interfaces and services provided to consumers are well specified, providing a sound basis for transition to an alternative supplier.
SOB17	Some of the standard elements of a service-based supply contract, e.g. a Service Improvement Plan, are not present.
SOB15/18	3rd Party support arrangements are typical for a system of this type which is built on a range of products, of various ages, from different suppliers. A likely future Cloud based system will have simpler support channels.

Futures: Context

Key Aspirations/ Intentions/ Requirements:

- Includes 2019 regulations-driven changes (Schema Change)
- Pipeline of aspirations arising from 2017 consultations e.g. Address improvements, Data Exploitation, UPRN Standardisation
- Potential Policy Changes – e.g. Digital Economy, Clean Growth, Brexit/EPBD3
- Other possibilities & opportunities – e.g. Smart Meter integration

However, future needs are not actionable for several reasons:

- Uncertainty – requirements are articulated as possibilities, with no firm commitment
- Absence of actionable clarity of requirement – requirements are articulated at a very ambiguous and high level
- Timescales for emergence of clarity – clarity and certainty will emerge from distinct requirement sets on different timescales (e.g. Brexit-related beyond 2019, Grenfell Review actions from Q4 2019, SAP Review Actions from Q4 2019)
- Funding lines not yet identified/ confirmed

Key Market Trends will drive the future model:

- Cloud Service delivery/consumption model & associated architectures (IaaS, PaaS, SaaS & Business 'as a Service')
- Off The Shelf Software, including certification, assurance & permit management
- In-sourcing SIAM and Systems Integration
- Differentiated Quality of Service (DQoS)
- Multi-sourcing of specialist providers
- Standards-based Interoperability & multi-versioning of interface services
- GDS requirements and guidance

Future: Lifespan of System Components - Context

- Industry benchmarks for ‘useful economic life’ of system components.
- Comparison with EPBR estate as at end of 2018 and 2019.

	Industry Average Longevity (Years)	*EPBR Estate Average @ Dec 18 / @Dec 19*
Servers	3 to 5	7/8
Firewalls	5 to 7	5/6
Network Switches	5 to 7	1/2
SAN Switches	5 to 7	5/6
Storage Systems	5 to 7	5/6

Factors that impact the actual longevity, which may be shorter or longer than industry averages, include:

- *how heavily, or not, the infrastructure has been utilised*
- *how well it has been maintained*
- *ability to obtain support (and spares), including security updates, either from the original vendor or a 3rd party*
- *continuity of compatibility with required software*
- *ability to support the ongoing business needs, for example against an increase in business capacity forecasted.*

Future: Lifespan of System Components - Heatmap

Component	2018	2019	2020	2021	Notes
Application Tier					
Domestic Web Application					• Currently on JEE v7, no forecast need to upgrade (v8 announced 08/17) during this period.
Domestic Configuration Application					• APEX compatible with Oracle Database versions used, no risk through 2018/19. • Configuration Apps would need rewritten if new solution not using Oracle.
Non-Domestic Web Application					• Currently on JEE v7, no forecast need to upgrade (v8 announced 08/17) during this period.
Non-Domestic Configuration Application					• APEX compatible with Oracle Database versions used, no risk through 2018/19. • Configuration Apps would need rewritten if new solution not using Oracle.
Shredder / Loader Application					• Currently on JEE v7, no forecast need to upgrade (v8 announced 08/17) during this period.
Registration Application					• Currently on JEE v7, no forecast need to upgrade (v8 announced 08/17) during this period.
Reporting Application					• SAP Business Objects, v4.1 current supported to 12/29, upgrade or replace.
Address Matching Application					• Experian / QAS, mature product with wide market base.
Development and Support Tools					• Dev / Support tools considered Landmark assets, by Landmark, hence not transferable.
Application Runtime					• Apache Open Source software, long term Community support. Upgrade in due course.
Database Tier					
Domestic Register Database					• Current support contract expires 05.18, must be renewed. • Oracle Extended Support for v12.1 runs to July 2021
Non-Domestic Register Database					• Current support contract expires 05.18, must be renewed. • Oracle Extended Support for v12.1 runs to July 2021
Data Warehouse Database					• Current support contract expires 05.18, must be renewed. • Oracle Extended Support for v12.1 runs to July 2021
Long Term Object Store					• EMC Centera - no end of life announcement, though technology is largely superseded.
Address Database					• Integrated 'back box' solution with Address Matching Application.
Technology and Hosting Tiers					
Linux Servers (IBM)					• Database servers (primarily) estate averages 6 years old. Withdrawn from market in 2014, 3rd party support only for several years. • Selective refresh and remediation to be considered.
Windows Servers (Dell/EMC)					• Backup management servers, now 5 years old.
EMC Storage					• Potential end of EMC standard support 12/19, no announcements on extended support options yet.
Network Switches (Cisco)					• Replaced in last 6 months.
Storage Switches (Brocade and IBM)					• Brocade 4100 switches were End Of Life at time purchased. In 3rd party support only. • *Consider refresh and remediation.*
Virtualisation Platform					• VMWare 5.5 (current) goes End of Life 09/18, possibility of limited duration extended support. • VM Host Servers (HP) now 8 years old.
Backup System (Veritas)					• Hardware in support. • Software needs upgraded to stay in support 2020 onwards.
Firewalls (Cisco and Fortinet)					• Firewalls reached End of Life in 2017, though still supported through 2021. • No new security signature updates from 08/20.
Operating Systems					• RHEL 5 End of extended support 10/20. • CentOS 7, updates through 06/24. • Windows Server 2008, supported until 01/20
Data Centre Network Interconnect					• Landmark shared asset, deemed not transferrable.

- Green – no refresh or remediation required
- Amber – possible refresh or remediation required.
- Red – probable refresh or remediation required.

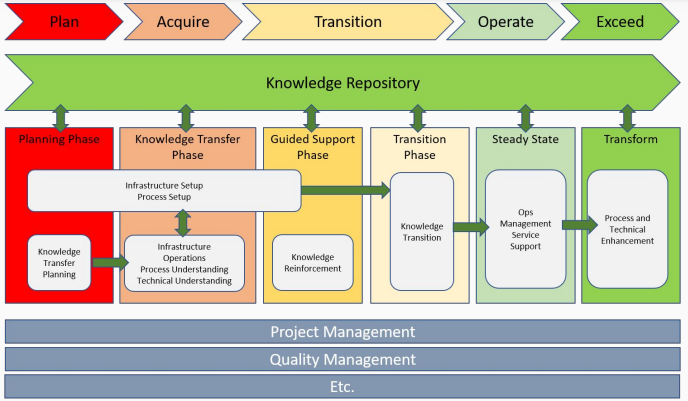
- Primarily in the 'green zone' through 2018 and 2019.
- Three components at risk:
  1. Database servers.
  2. Storage switches.
  3. Virtualisation platform.
- Looking ahead through 2020 and into 2021 the status of more components begins to 'flash amber'.
- Remediation action dependent on procurement stance and expected outcomes.

Future : Lifespan of System Components – Key Observations

	Observations
LOB01	The EPBR service is technically capable of running through to the end of 2019 and beyond if : •hardware and software stays in support (including supply of security updates) •the (stable) architecture is not destabilised through change •there is no major change to the business workload on the system.
LOB03	Ensure that key 3rd party support service suppliers, particularly 101 Data Solutions (the primary infrastructure support provider) are engaged early to check the viability, and cost, of supporting the ageing estate through to 2020.
LOB04	Commission Landmark to provide impact assessments for remediation of Database server estate, SAN switches and the VMWare hardware and software platform. Consider these impacts in conjunction with the outcomes from assessing the ability to extend support arrangements for the existing estate.
LOB05	Restrict the amount of business change implemented to regulatory change and resolution of highest priority bugs. To protect the existing platform from change and permit Landmark to focus on sustaining the service and managing operating costs.
LOB06	VMWare virtualisation platform could significantly facilitate migration of the existing service applications (but not databases).
LOB07	Any replacement servers will be significantly more powerful and provide better performance that the current estate, hence a smaller overall 'footprint' will be required.
LOB08/09	Factor a realistic timeline for a service transition and replacement into investment decisions
LOB10	The Landmark team supporting EPBR is small in numbers. Some of the same resources who provide support will likely also be required to respond to the Exit notice being served and to support a bid by Landmark for the new contract.
LOB11	Relaxing some NFRs, e.g. zero data loss, may release some spare capacity to be used in remediating failed components.
LOB12	Consider an embargo on any extended use, from current baseline, of Oracle proprietary features such as Stored Procedures and Application Express, other than in exceptional circumstances, e.g. resolution of Severity 1 problems.

Transition of Existing to New Management

- Any Managed Service can be transitioned, value proposition depends on competitive pricing and risk, driven out through procurement process.
- Consider testing market interest and appetite through a Pre-engagement activity
- Candidate suppliers will tailor established transition frameworks (generic model opposite) to EPBR situation
- Assessed practicalities, transitional solution scenarios, knowledge transfer, asset ownership/transfer and logistics (rather than cost-effectiveness).
- Transition only as a stepping stone to a) remediate any 'burning platform' obsolescence issues then b) as a basis for service improvement and transformation.



- Minimum viable technology changes to transition are replace a) Landmark owned development and support tools, and shared inter Data Centre network connection.
- Takeover – Migrate – Stabilise – Improve/Transform.
- Anticipate phase migration – by Register type or by Technology type.
- Landmark engagement pivotal – knowledge transfer and guided support. Key resource retention plan required.

Transition of Existing to New Management – Key Observations

	Observations
TOB01	The EPBR service could be transitioned to another supplier, whether it is cost-effective to do so depends on competitive pricing that can only be judged during the procurement process.
TOB02	Transition of service in-situ is an interim state, should be considered a stepping stone to a service transformational.
TOB03	It is assumed that all licenses and support contracts can be novated, transferred or replaced though the impact (e.g. charges) is unknown. *This needs to be better understood prior to procurement.*
TOB04	Landmark Domestic & Non-Domestic Exit Plan (v0.4) documents, last updated in 06/15, is an activity list rather than a plan.
TOB05	The Authority has pivotal role and responsibilities in orchestrating and assuring a transition plan, collaborating with existing and new suppliers. This is a major task which needs to be planned and resourced early.
TOB06/07	The need for continued support from Landmark during Takeover and Migration stages is recognised in the draft Exit Plan, though loss of skilled resources due to contract termination may weaken capability to provide required support.
TOB08/09	A 'big bang' migration of the EPBR in-situ is highly unlikely to be viable, therefore anticipate a phased migration, for example Register service type or by architectural tiers. Phasing may require some interim engineering workarounds as the Register services consume some shared architecture components
TOB10	The volumes of data to be migrated requires a well thought out strategy, thorough rehearsal and in-built, automated assurance to ensure no loss of data or data integrity.
TOB11	Do not conduct a bulk data quality improvement exercise during the data migration process. Do it beforehand or, preferably, post migration as part of service improvement and transformation initiatives.
TOB12	Minimum viable change on transition is replacement of Landmark owned development and system management tools.
TOB13	Consider testing the market interest in transition through a pre-engagement activity.

Alignment with Purpose (Service Levels)

Contracted vs Delivered Service Levels

- Performance & response times delivered significantly in excess of contracted – has led to unnecessary (sunk) cost. Examples include: a) Target Response Time of <2min with max actual=20s, average actual=0.9 secs b) <1min with max actual=12s, average actual=0.7s c) <1min with average actual=0.3s d) <8hrs with average actual=0.006s)
- Contracted levels likely to be below scheme & user expectations (set by current system performance).
- The Dom Service Specification omits a significant number and precision of requirements found in the Non-Dom Service Spec. For example Dom does not specify any NFRs/Service Level Requirements (e.g. response times, availability)
- There is significant over-capacity (and therefore room for 2019/2020 growth) in a number of areas (e.g. CPU VM 6.9% (although needs peak load requirement identified), CAS Storage 27%, Live Data Warehouse, Live ESRI, Load ESRI, Memory GB).

Service Level Requirements

- Availability of individual Operations in the Service Specifications are a blanket 99.99% – it is likely that this is much higher than necessary and not sufficiently differentiated to enable value-engineering of the underlying Software/ Platform/Infrastructure
- MHCLG should review high availability and 'Zero Data Loss' requirements – it is likely these are uneconomic (the existing solution is over-engineered)
- Almost all 3rd Party support contracts are for 24x7 4hr response time break/fix support. Given the degree of resilience and redundancy, these could probably be reduced.
- MHCLG should consider removing the requirement for the industry-facing services (e.g. working groups, requirements gathering) during the contract extension. There is already a Significant backlog and requirements will be better considered as part of the 'Next Generation'.

Key Requirements for Next Generation:
Service Levels, KPIS & Non-functional Requirements

Specific reduced levels of Response times and Performance are suggested in main report, but need validating with Actor/User community and current expectations considered. Examples include:

#	Name	Dom/ Non-Dom	SLA/ KPI		
			Required	Delivered (Average)	Suggested (Interactive)
2	Request Unique Property Reference Number (Lookup Existing)	Non-Dom	<30s	<2s	<5s
3	Lookup Property Unique Property Reference Number	Dom	<1m	<3s	<5s
9	Submit and lodge Energy Documents and Model Data	Non-Dom	<1m (06:00-24:00);	<8s	<30s
11	Change in status of Energy Documents and Model Data	Non-Dom	<1m	tbd	<10s
13	Retrieve and view Energy Documents & Model Data	Non-Dom	<30s	<0.7s	<30s
17	Update Energy Assessor Index	Non-Dom	Before 'Next Day' (in Svc Spec);	<0.007s	<30s

Key Requirements for Next Generation:
Technical Design, Requirements & Constraints

Sourcing & Delivery Models

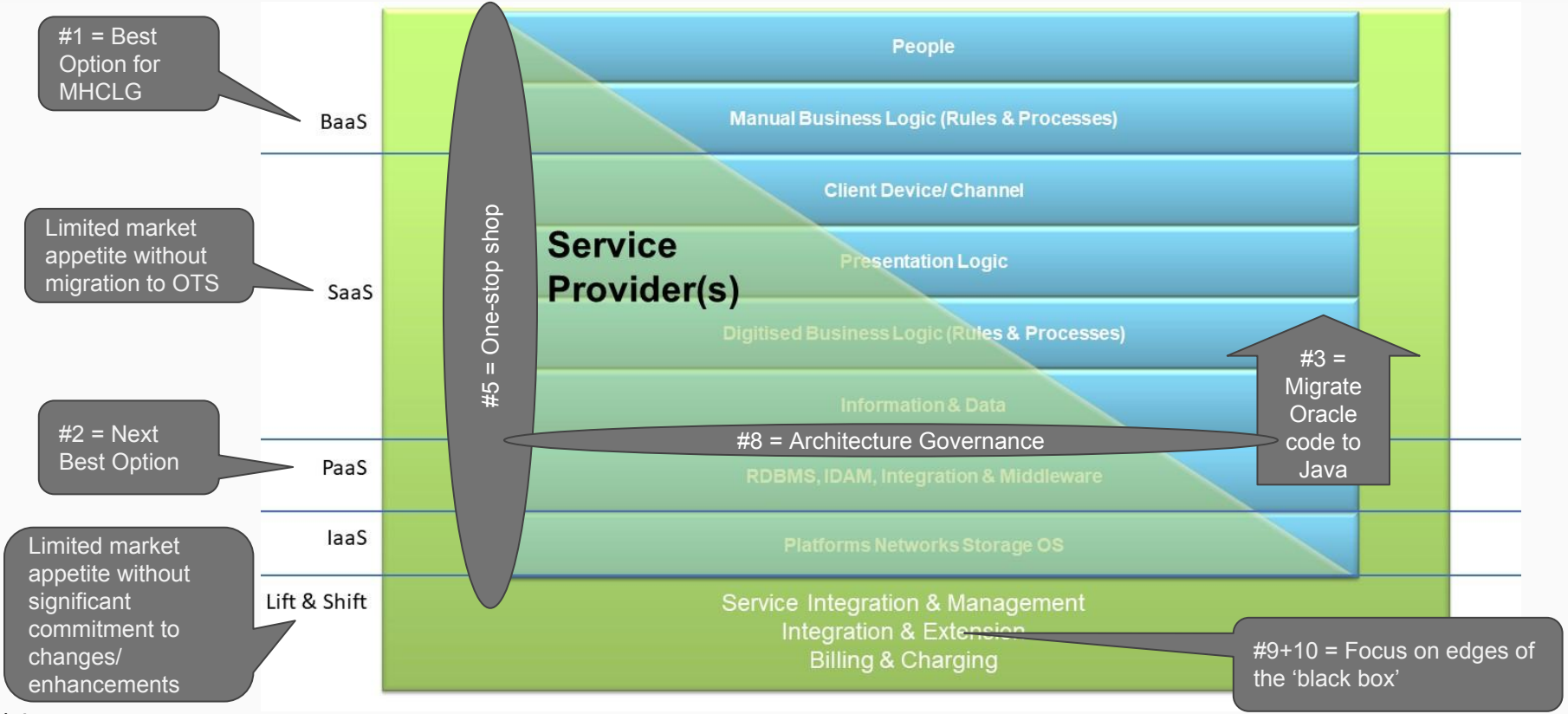
(Models visualised on next slide - numbers overlayed on graphic)

1) The ideal option would be - BaaS (Business as a Service) to deliver a self-managing, self-funding EBPR capability. EPBR is a well bounded self-contained service and system.
2) Alternatively a PaaS model to drive better alignment of Technical Capability/Cost with Service Level Requirements & simplify Tech Refresh, Asset Management & Availability Solutioning (e.g. DR);
3) PaaS options (e.g. providers) could be maximised by reducing/eliminating dependencies on proprietary Oracle capabilities & allowing service provider to select/manage appropriate RDBMS to deliver suitable feature/function and Service Levels.
4) MHCLG could consider new off-the-shelf Software and migration of Data – but care needed to ensure Data availability & integrity + costs/risk of re-development (e.g. Interfaces) do not outweigh benefits.
5) Given also that EPBR is almost a standalone service, MHCLG should look for a 'one-stop-shop' to deliver an integrated bundle of services (i.e. rather than unbundle specialised services into 'Towers')

Technical & Service Design

6) Through PaaS - MHCLG become agnostic of Technical Design, other than Platform Compatibility
7) Through BaaS - MHCLG become agnostic of all specific features of the Technical Capability other than interfaces and to ensure portability of data and business logic.
8) If PaaS is the selected option, MHCLG should create & Implement MHCLG Solution Architecture Governance Policies & Standards (e.g. to limit/freeze use of Stored Procedures & other Oracle-proprietary capabilities like APEX)
9) The majority of near and long-term drivers imply the need for greater interoperability & extensibility rather than introducing any new/complex business rules/logic.
10) This points to more specific focus on Integration & Extension Capabilities (and Pricing) to minimise the turnaround time for emerging requirements.
11) Portability of software components and data will be needed to ensure flexibility of adoption of new Platforms and sourcing in the future.
12) All change at present requires pushing a requirement through a system/software development process, however agreeing requirements and funding takes the majority of total time to change

Key Requirements for Next Generation:
(#'s from previous slide)



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