

**Trac-Car**

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### **Data Intelligence - Accelerating Information Delivery**

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# 1 EXECUTIVE SUMMARY

The requirements for many organizations to integrate existing systems with an increasingly mobile workforce, and increasingly sophisticated customer interaction comes at an interesting time of technology development.

Staff and customers alike require an increasingly secure and effective web experience delivered to a wide variety of computing devices, over wired and wireless networks, private and public.

Current enterprise application technologies are around 15 years old in architecture and design, so investment in proprietary integration around a large vendor suite would not be cost effective, as proprietary protocols are not understood by new generation technology.

Serious integration technologies have developed and advanced in recent years.

1. Web services and ESB are relatively high latency with considerable processing overheads, finding a niche in relatively low volume business application function integration
2. With the voluminous growth in near and real-time data collected, for high volume/performance low latency messages, event stream processing is becoming a highly specialised means of data and application integration
3. High volume/performance streaming media and other content has triggered improvements in guaranteed content delivery using improved network protocols
4. Growth in the amount and diversity of data has necessitated a semantic approach to integration, common information models to define interface definition and common taxonomies to catalogue business processes and technology services.

Application providers, with internal proprietary protocols linking application modules, around proprietary logical and physical data models made a lot of sales in the past by ensuring that customers were locked into their product sets. They are now experiencing large declines in direct proportion to the growth of international open standards and protocols, facilitating the emergence of small niche technology players as customers become more conscious of technology spending. Some large vendors have invested more than others in standard protocols. When selecting from large vendor offerings, product architecture is an important criterion for evaluation.

Integration can now be purchased separately from functional applications, based on technology standards.

In many situations, existing functionality can be accessed with existing or purpose built adaptors.

Best practice is a combination of buying specialist functionality, and building adaptors to existing bespoke technology.

The real challenge is how to get the mix right, and how to integrate functionality. Vendor applications requiring development interfaces to web services or proprietary data models are to be approached with singular caution.

The real questions to be answered exist around the use of common integration technologies

1. ESB and web services
2. Data integration
3. Event stream processing
4. Content federation and aggregation

There are a number of technology delivery patterns that apply to individual organizations. However, industry verticals are insufficient to choose technology, as the the selection of functions and functional integration are influenced by a combination of factors. These factors include:

1. Distribution of data sources
2. Current and forecast performance and user interaction requirements
3. Current hosting and network configuration and technology
4. Completeness and complexity of information architecture

It is essential to develop and adhere to a strategic architectural roadmap, that takes into account both business directions and technology developments.

There is no standard formula for this strategic technology approach, it must be developed to suit the individual characteristics of the organization.

Many companies are faced with the challenge of developing software, hardware and network infrastructure while the rules of the game are changing fast.....



Figure 1: A changing technology landscape in the corporate sector

The methodology used to review current technology, and roadmap new technology has to take into account, the intelligence in the data.

Less storage and fewer transformations, value adding close to collection, analysis of end use of data, means that more information is available from physical data records.

The most cost-effective solution, is to design integration around the data collected. Interim data stores may be as diverse as transactional persistence, or as sophisticated as highly aggregated data marts.

Unless there are compelling external factors, the best performance value is to be found by analysing data content, providing dynamic transformations and value adding as close as possible to the data collection source, with a view to minimising final storage for maximum information content. Consideration has to be taken of current data access requirements of course, as well as forecast usage patterns.

For this reason, the following information is mandatory before publishing a technology roadmap aligned to business visions and concepts.

1. A comprehensive integration framework
2. An organization wide information architecture
3. Forecast information access requirements
4. Forecast organization technology device utilization, including telemetry
5. A network and hosting capacity plan based on these forecasts.

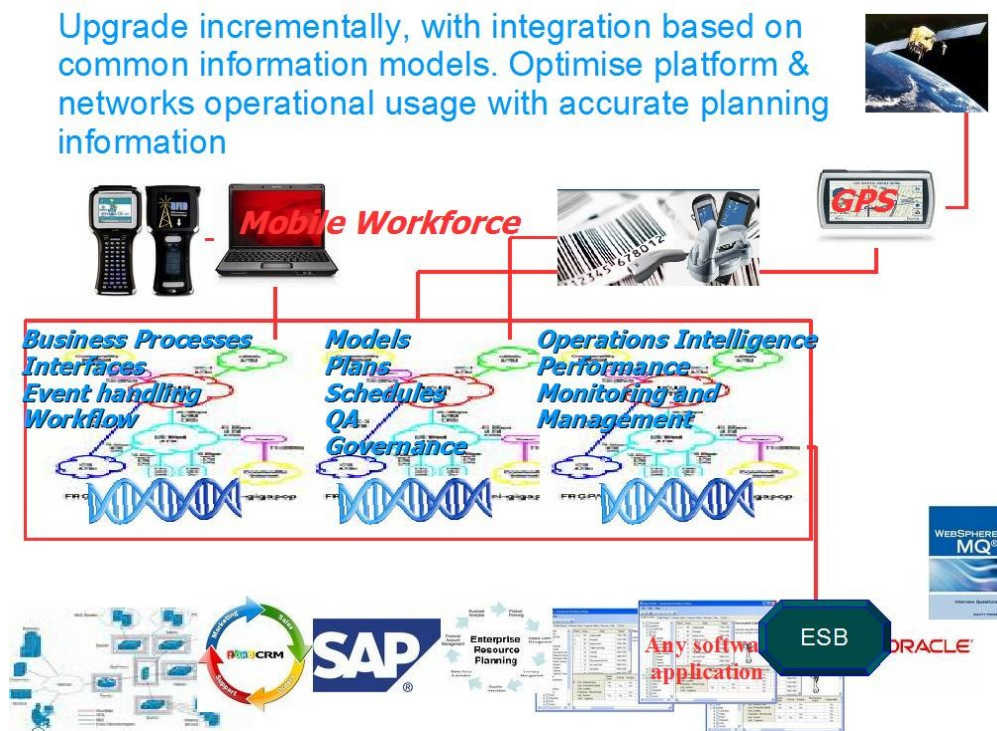


Figure 2: Plan Integration strategy in view of future business

Formulation of a business and technology roadmap without this knowledge leads to uncertain outcomes, as planning information has to be forecast on technology capacity utilisation, rather than the vision of business users alone.

It is essential that any technology strategy takes into account the econometrics of technology lifecycles, as well as total cost of ownership. Without a firm foundation of performance metrics and capability benchmarks, business visions almost invariably founder on the rocks of technology integration costs.

## 2 OVERVIEW

In view of the challenges faced by organizations to meet changing business and technology landscapes, it is essential to establish a clear way forward, understanding that past technology has value in its context, but outdated technology approaches have to be replaced with new paradigms.

It is now essential to understand that application integration and data integration have to be viewed in the context of performance analytics, and associated costs.

Best-of-breed hosting and network configurations are able to automate the allocation of processing resources in real-time, minimising expenditure.

Software infrastructure has to keep pace with technology developments, as there are huge economies to be made in understanding the right technology solution for a particular problem, and, on the contrary, inflated costs for providing suboptimal technology choices, in terms of development, hosting and storage costs.

It is also important to understand that some technology offerings in the marketplace look cheaper than others.

However, inflexibility has an even higher price tag, as it precludes business change from being accommodated by technology.

All technology offerings have to be examined to understand the underlying architecture, and the real implications of adoption.

## **2.1**

## **Purpose**

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The purpose of this document is to broadly examine the feasibility of moving into a technology deployment, where an increasingly mobile workforce inputs information into enterprise systems, with a sophisticated mix of human and automated workflow.

And this landscape is characterised by business process interconnection technology, to supply an increasing amount of diverse information to a public with increasingly sophisticated web interaction habits.

There are ways to ensure that technology change happens rapidly, efficiently, and cost-effectively.

## **2.2**

## **Methodology**

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The information at the basis of this review is knowledge of industry best practice technology and technology architecture methodology

This analysis is provided from the perspective of contemporary architectural best practice for integration of last generation standalone enterprise applications, knowledge of software, hosting and network infrastructure architecture, information architecture based data integration and event processing, and federated web experience management. In the context of standard practice hosting and network scalability on demand for volume data transaction capability.

## **2.3 picture'**

## **Architecture 'big**

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Mobile device technology is changing rapidly. Improvements are being made rapidly in:

- RFID readers
- GPS chipsets
- Mobile functionality e.g. field data positioning using existing radio networks, smart SIM cards able to be provisioned over-the-air, and integrated with LAN/WANs.

Mobile devices are likely to provide more functionality and become ubiquitous and increasingly lower in price over time. It is important to ensure that advances in technology can be taken up. This means that integration of device functionality is a very important criterion for platform selection, as field work and fleet tracking embraces satellite positioning and remote profiling.

At the same time, enterprise applications such as ERP, CRM and Human Resourcing systems have to be integrated with increasingly sophisticated web experience delivery to customer and staff portals.

However, many vendors have locked customers into proprietary integration technologies, discouraging the adoption of newer, more agile technologies.

And bespoke technologies can be equally problematic, with crucial and critical knowledge not so well documented.

Application technology is well understood, and the difference between vendors, and bespoke development is relatively slight in terms of development, hosting and storage costs.

The critical area of technology spend is integration.

Integration technologies can be confusing. Some of the questions being asked, are around what technology to use and where. For example, when to use web services, when to use messaging, when to use event processing, and what is the best approach to ensuring common models for interfaces between heterogeneous data collections.

For any technology improvements, to ensure that additional peripheral devices or functions can be added, without requiring change to the core platform, it is important to

1. Define and catalogue integration services
2. Integration capability able to accept GPS, RFID and other telemetry data

Security governance is now a critical component of any new technology developments, with often diverse identity and access management systems requiring federation.

This monograph seeks to determine a path whereby governance mechanisms can provide clear direction for fixing current technology issues, and advancing new technologies.

It is critical to aim a lens on current technology systems, practices, architecture and design.

There are some well known problems such as data integrity, unfettered proliferation of identity management, and the effort required to access proprietary and bespoke applications.

Many organizations do not have the knowledge on board to make strategic decisions about the best way forward, in the face of a complex integration challenges that include

1. How to optimise business applications
2. How to optimise software, hardware and network infrastructure
3. When to use web services/messaging/ESB/point-to-point or Complex Event Processing integration
4. How to deal with a growing number of passwords and logins
5. How to deliver content to customers and internally to staff so that the web experience is optimised
6. How to incrementally implement technology improvements in step with budgetary constraints

To summarise, many current deployments are problematic, however the problems are solvable, with QA of current technology, and devising practical strategies, based on reasonably extensive analysis of forecast performance requirements as well as current delivery. These strategies have to be put into the time framework of a technology deployment plan.

## **2.5**

## **Opportunities**

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There are major opportunities to act on technology improvement. The challenges involved, are typically, accessing information in a timely way, providing high performance web experience, and enabling flexible business process and workflow implementation, in the context of rationalised hosting and network infrastructure costs.

The opportunity is to provide a best practice integration platform that will provide cost savings for current and future business applications and technology, by

1. Cost savings on reuse of interfaces defined by common models
2. Knowing how to choose appropriate integration technology
3. Knowing when to build adaptors to current functionality and when to buy new technology, and what sort of technology suits the organization
4. Knowing when to use event handling, messaging and web services style application integration
5. Providing a semantic data integration that enables incremental adoption of functionality to schedule

## **2.6**

## **Challenges**

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There are a number of challenges to be met and overcome in avoiding current technology pitfalls

1. Proliferation of interface development using different protocols and technologies
2. Voluminous stores of data with complex and difficult information accessibility
3. Integration across applications by different vendors on a case by case basis, with no common strategy.
4. Becoming locked into vendors proprietary integration and interface protocols, and thereby extended integration development costs.

## 2.7

## Stakeholders

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The stakeholders in general terms are:

1. Business owners
2. Technology owners
3. Customers and business partners
4. Internal application users
5. Data managers and administrators
6. Software, hardware and network infrastructure owners

## 2.8

## Characteristics

## Solution

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An outline of the solution characteristics that will address the core patterns responsible for the current crop of organization technology challenges is as follows:

1. Accuracy and integrity of data
2. Ability to update business processes readily
3. Centralised standard ways to define interfaces, mapped to common models.
4. Ability to do complex event processing when required
5. Ability to federate content for delivery to multiple access channels based on automated display transformations
6. Ability to define workflows and business processes in a consistent way
7. Identification of all end users with reference to a centrally managed set of roles for security of access to function and data.

## 2.9

## Change

## Technology

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A brief descriptive outline of the technology strategies that will be required to achieve a well governed and managed technology portfolio are as follows:

### Analysis Phase:

1. Analyse the current technologies, network and hosting arrangements

2. Develop architecture and program governance including information models, integration interfaces, operational reporting, and security elements.
3. Automated discovery of existing data collections, data validation and integrity diagnosis using data discovery technology
4. QA covering UAT and performance metrics of existing functionality.
5. Develop technology plan

**Improvements Phase:**

1. Incremental development of functionality improvements
2. Delivery of internal and web content management improvements
3. Introduction of suitable integration technology for application and data integration
4. Federation of identity and access management to all functionality.

### **3 RECOMMENDATIONS**

The primary recommendation for any organization engaged in technology change, is to conduct the following activities:

1. Review of the current situation and technology based on some fundamental practical principles.
2. Assessment of bottlenecks and critical paths to meet business goals and visions.
3. Ensuring that business requirements are adequately modeled and addressed.
4. Assessment of existing functionality for ability to be integrated into overall solution
5. Identification of new key solution components and evaluate overall fitness for purpose and value for money.
6. Development of overview best practice integration model to meet technology objectives, including
  - a) enterprise data intelligence
  - b) web experience management, including content federation
  - c) choice of suitable integration technologies in view of performance metrics and industry best practice.
7. Identify solution issues and risks, in the context of the current technology deployment and business processes.
8. Identify and plan phased activities to be undertaken, in view of the specific organization challenges e.g. feasibility study, detailed design, technology proof-of-concept, program planning, firm pricing within a stated timeframe, with particular critical objectives and milestones.