Understanding Services: Understanding Stakeholders

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Context

- UK Economy largely service-based
  - 78% of UK GDP, 80% of labour force
- Enormous range of services
  - Education, Healthcare, Transport, Outsourcing, Information, iPhones, etc.
- Traditional customers are changing
  - from buying products to paying for services
  - focus on Outcomes and Value, not on Equipment
- Suppliers need to change
  - from focus on products to providing services
- Engineering needs to change
  - to engineer the service – not just the product – and the environment
- One size does not fit all
  - groups of similar services, => similar issues => similar engineering

This Work
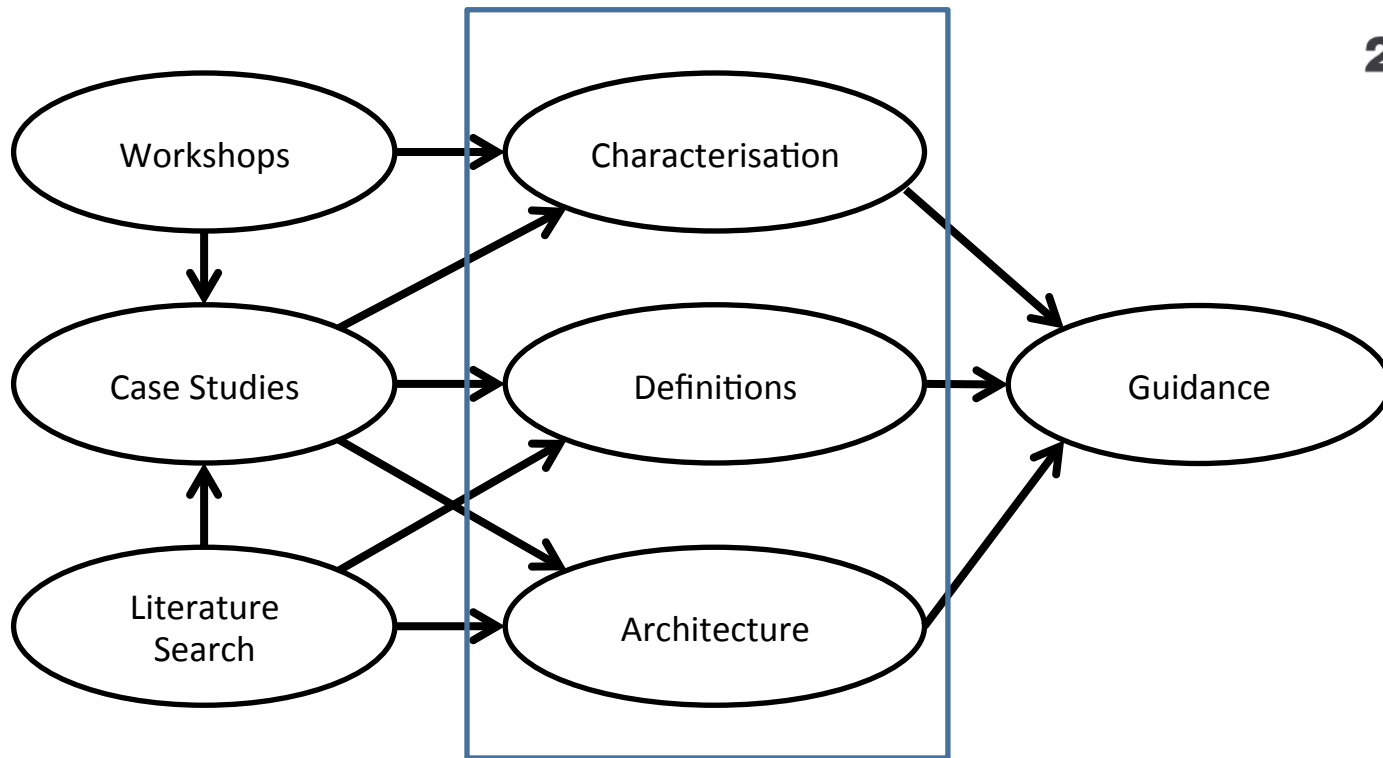
Content

- What is a Service?

- What types of Service are there?

- What characterises a Service?

- How can we engineer Services?

- What's next?

What is a Service?!!!?

- Military service: a country's armed forces
- Domestic service: employment in a residence
- Public services: services carried out with the aim of providing a public good
- Service (motor vehicle)
- Table service: food served by waiters and waitresses, also known as servers
- Service of worship: a meeting for the worship of a religious deity
- Service (tennis): a shot to start a point in tennis

What is a Service in a Systems Engineering Context

Business Area	Definition	Source
Economics	In economics, a service is an intangible commodity. That is, services are an example of intangible economic goods.	Wikipedia
Capability Maturity	A product that is intangible and non-storable.	CMMI
Computer Engineering	A logical representation of a repeatable business activity that has a specified outcome.	The Open Group
Service Oriented Architectures	The IT realization of some self-contained business functionality. Technically, a service is a description of one or more operations that use (multiple) messages to exchange data between a provider and a consumer.	SOA in Practice
UK Defence	Services are an implementation-independent specification of a packaged element of functionality.	MoDAF]
INCOSE SE Handbook	Services are activities that cause a transformation of the state of an entity (a person, product, business, region, or nation) by mutually agreed terms between the service provider and the customer.	Systems Engineering Handbook v4
SE Book of Knowledge	An activity required by one or more users who have agreed on the terms of outcomes and quality of service without details to how it is provided.	SeBOK
US Defense	A mechanism to enable access to a set of one or more capabilities.	DoDAF

Service Definition Map

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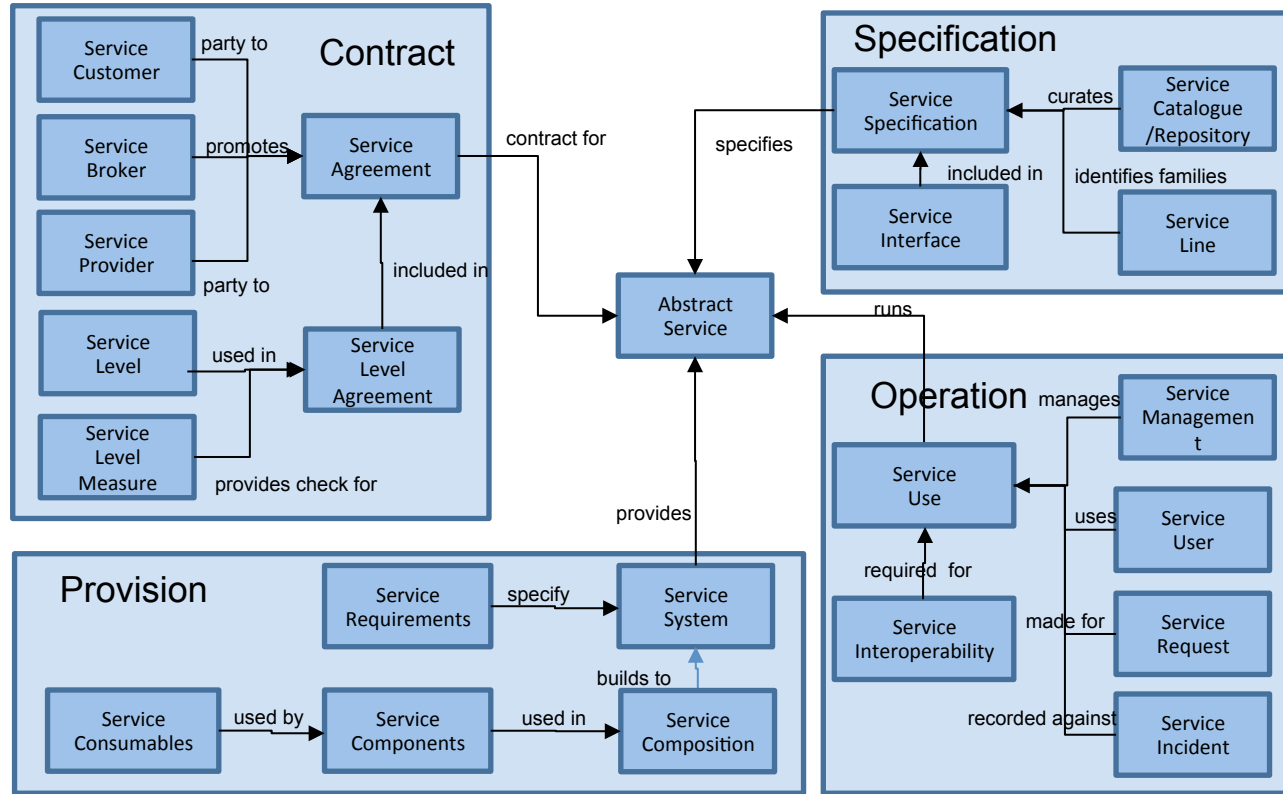
Types of Definitions

Type	Focus	Used for definition in
General	General reference with no main focus - intangible	CMMI, Economics
Contract	On the use of the Service Level Agreement.	SEBok SE Handbook v4
Specification	On defining what the Service does	Computer Engineering UK Defence
Provision	On how the service is constructed	US Defense
Operation	On how the service is managed	ITIL v3 (IT Systems Management)

Harmonised Definitions – first lot

Term	Definition	Used in examples
Service (Abstract)	A product that is intangible and non-storable	Business, finance CMMI
Service Agreement	A binding, written record of a promised exchange of value between a service provider and a customer.	Contracts
Service Broker	Trusted advisors or intermediaries who facilitate commercial transactions.	IT – automated service composition
Service Catalog/Repository	A list or repository of standardized service definitions	Government Service G-NET
Service Component	An element of the Service Design that may be a lower level service, or a product.	Design of Services
Service Composition	The assembly of distributed component services into a composite service to complete the desired application.	Design of Services through Integration INCOSE Handbook v4.0
Service Customer	The party responsible for accepting the product or for authorizing payment.	Service contracts
Service Incident	An indication of an actual or potential interference with a service.	Service Operation
Service Interoperation	Ability of Services to integrate and operate together.	Service Operation
Service Level	A defined magnitude, degree, or quality of service delivery performance.	Service contracts
Service Level Agreement	A service agreement that specifies delivered services; service measures; levels of acceptable and unacceptable services; and expected responsibilities, liabilities, and actions of both the provider and customer in anticipated situations.	Service Contracts

Harmonised Definitions – second lot

Term	Definition	Used in examples
Service Level Measure	A measure of service delivery performance associated with a service level.	Service Contracts
Service Line	A consolidated and standardized set of services and service levels that satisfy specific needs of a selected market or mission area.	Service company offerings
Service Management	The activities that are performed by an organization to plan, deliver, operate and control services offered to customers	Government contracts for services using ITIL
Service Metrics	Service Level Measures and data collected about their attainment	Service Contracts Service Operation
Service Interoperation	Ability of Services to integrate and operate together.	Service Operation
Service Management	The activities that are performed by an organization to plan, deliver, operate and control services offered to customers	Government contracts for services using ITIL
Service Provider	A company or other organization that provides a service.	Service contracts
Service Registry and Repository	A repository containing service specifications provided by Service Providers that allow Service Brokers to see what Services are available.	Service offerings Automated or non-automated
Service Request	A communication from an end user that one or more specific instances of service delivery are desired.	Use of services

Harmonised Definitions - third lot

Term	Definition	Used in examples
Service Requirements	The complete set of requirements that affect service delivery and service system development.	Requests for supply of services prior to contact
Service Specification	Formal definition of a service	Specification of services – normally in formal language MoDAF, SeBOK
Service System	An integrated and interdependent combination of component resources that satisfies service requirements.	Provision of services, in any situation SOA Open Group
Service System Component	A resource required for a service system to successfully deliver services.	Parts of the Overall Service, may be Services or Products
Service System Consumable	A service system component that ceases to be available or becomes permanently changed by its use during the delivery of a service.	Power, water, etc.
Service Use	Phase of lifecycle when the service is in use and those elements specifically concerned with that use	Facilities management
Service User	People who use services or a higher level service that uses a lower level service.	Consumers of the service
Service Wrapper	A computer program that provides an interface to existing functionality enabling them to be run as Services	Provision of existing functionality but as a Service DoDAF

Content

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- What characterises a Service?
- How can we engineer Services?
- What's next?

What types of Service are there?

- Think Pieces

- Literature Search

- INCOSE UK Service Systems Engineering WG

- AFIS work

- Cambridge Services Alliance
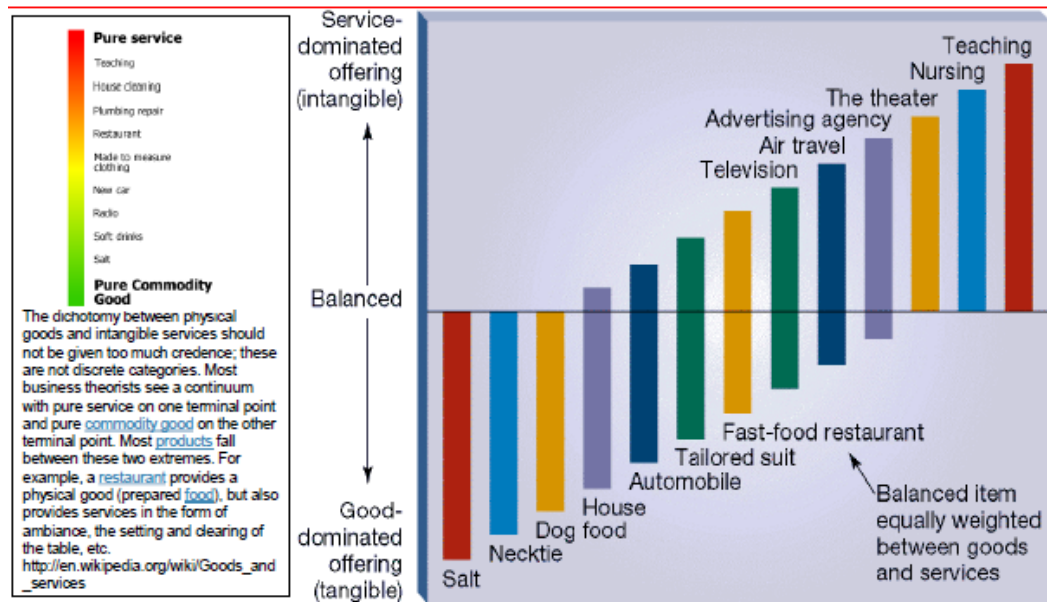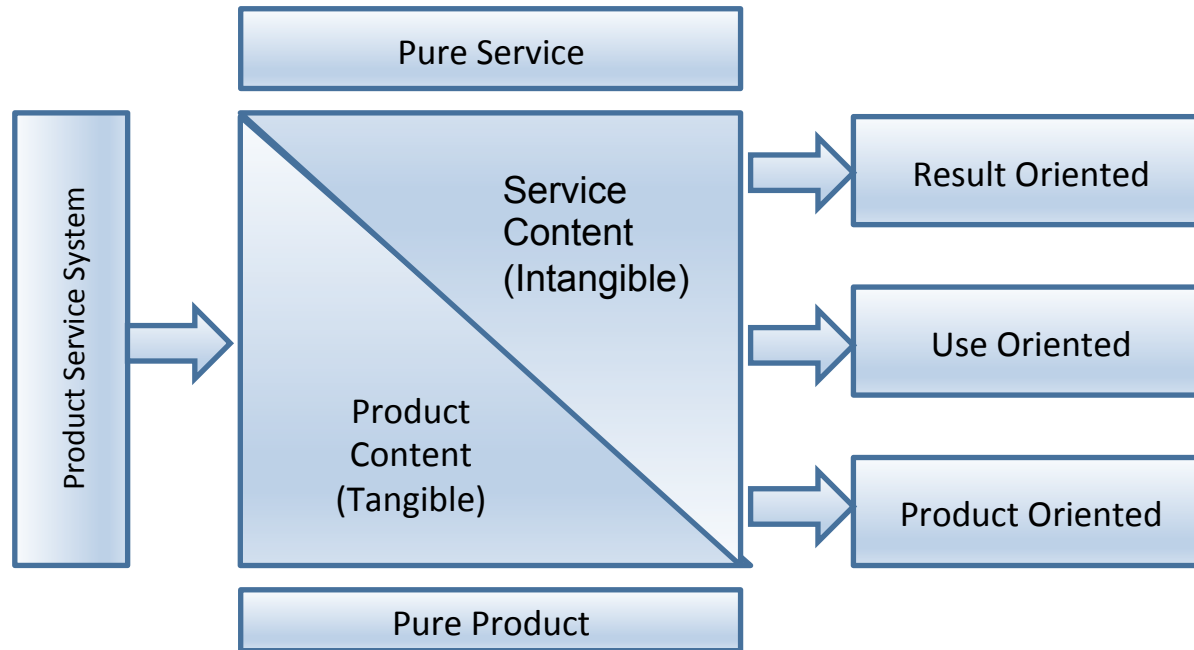
Service Dominated or Goods Oriented

The goods-service continuum

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BAE Systems May 2013

Pure Service

Product Service System

Service Content (Intangible)

Product Content (Tangible)

Pure Product

Result Oriented

Use Oriented

Product Oriented

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Complexity in Services
Benedettini and Neely (2012)

- 'How can Complexity in Services be defined?'
  - Literature Search
  - 4 databases of publications
  - 26,989 unique hits
  - 889 unique papers reviewed
  - 127 papers selected
  - 76 potential factors identified
- Main factors
  - Complex vs Complicated
  - Intrinsic vs Designed

Characteristics of Services
(SSE WG)

Management

Context and risk

Risk (compliance, regulatory, market, intangibles)
Risk (of Regulatory Change)
Risk (of Supplier non-performance)
Risk Profile
Risks in Solution
Uncertainty in characterisation of desired outcome
Unknowns in Requirements
Constraints – legislation, regulatory, standards
Regulations
Risk (of Regulatory Change)

Planning/Execution/Disposal/Cost

Cost of disposal
Cost of re-supply
Costs of maintenance of the service
Costs of usage of the service
Delays
Preparedness

Stakeholders

Stakeholders and relationships

Contractual concepts
Contract Liability
Political Factors
Potential for intelligent procurement
Culture of Service Provider ('minimal' to 'Above and Beyond')
Cultural Distances
Customer impact on performance
Customer/User division
Distance from customer domain
Type of Customer
Type of User

Technical

Technical Reqs and Solution

Complexity of Service
Complexity of the supply chain
Complicatedness of Requirements
Complicatedness of Solution
Critical resources
Environment
Materials
Service components

'ilities' Properties of the Solution

Adaptability
Availability
Disposability
Environmental performance
Flexibility (of Scale and of Scope)
Human Factors
Obsolescence
Reliability
Security
Usability/accessibility

26th annual INCOSE international symposium

Edinburgh, UK
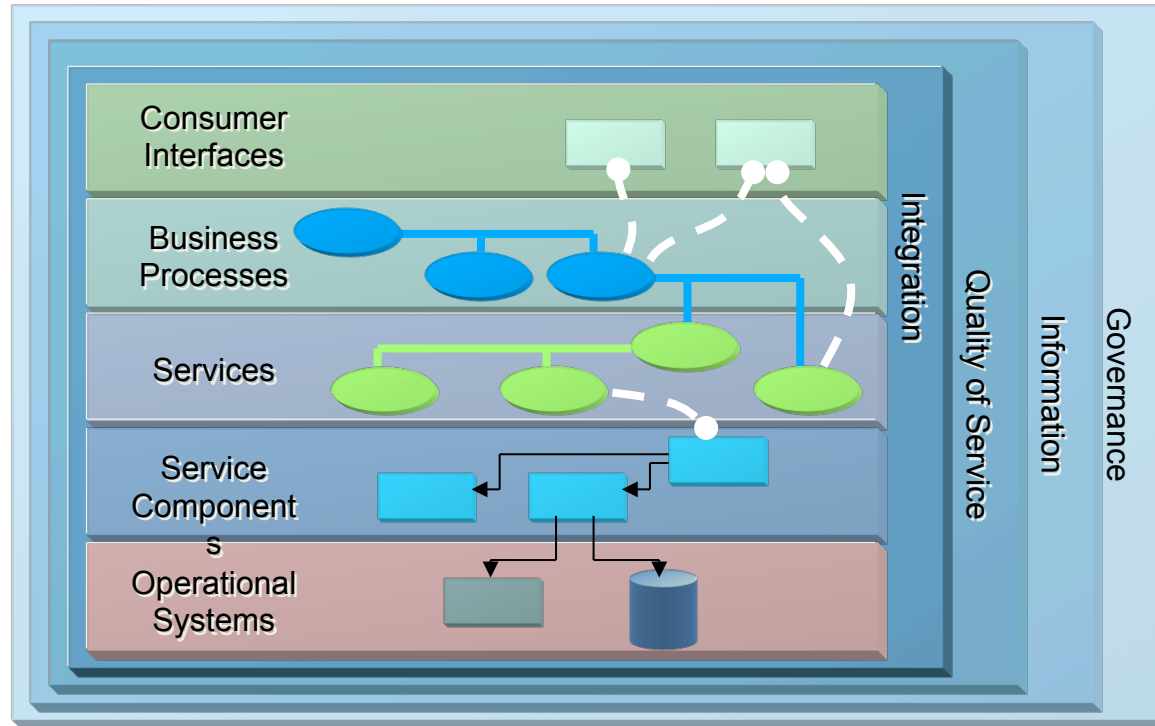July 18 - 21, 2016

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How can we Engineer Services?

- Service Oriented Architectures (SOA)
  - AFIS work
  - NECTISE/Leeds/BAE Systems
  - SSE WG
- Architecture Frameworks
- MoDAF Service Views
- TOGAF
  - Process and Products
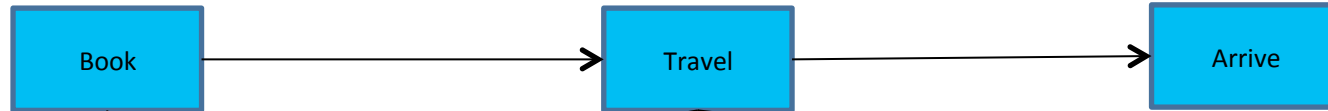- ITIL/ISO
  - Management Processes

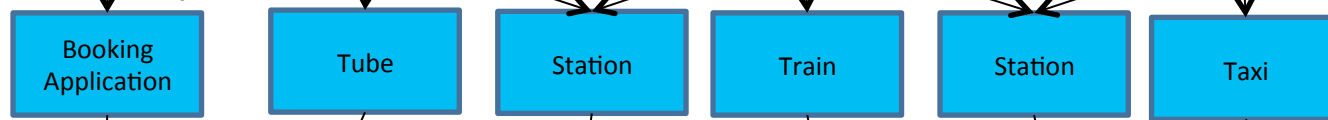# The Open Group SOA Reference Architecture

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Rail Transport Case Study: SSE WG

Business Process

Services

Service Components

Operational Systems
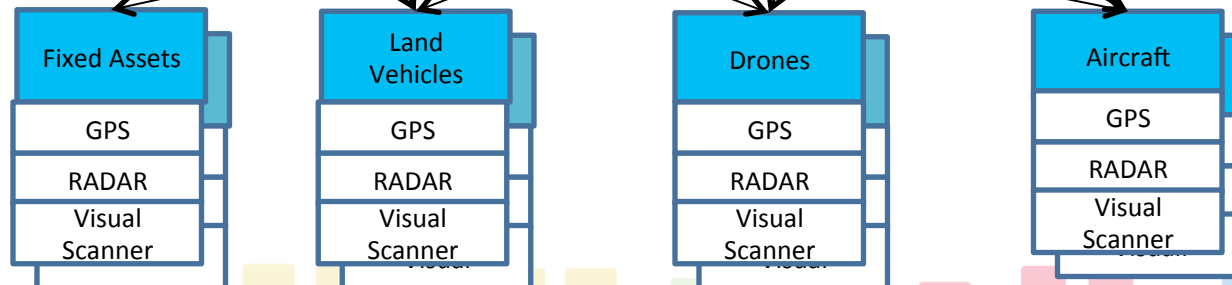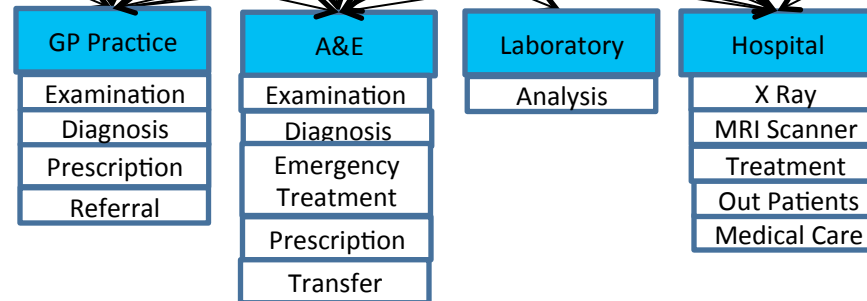
NEC Area Surveillance (based on Liu et al)

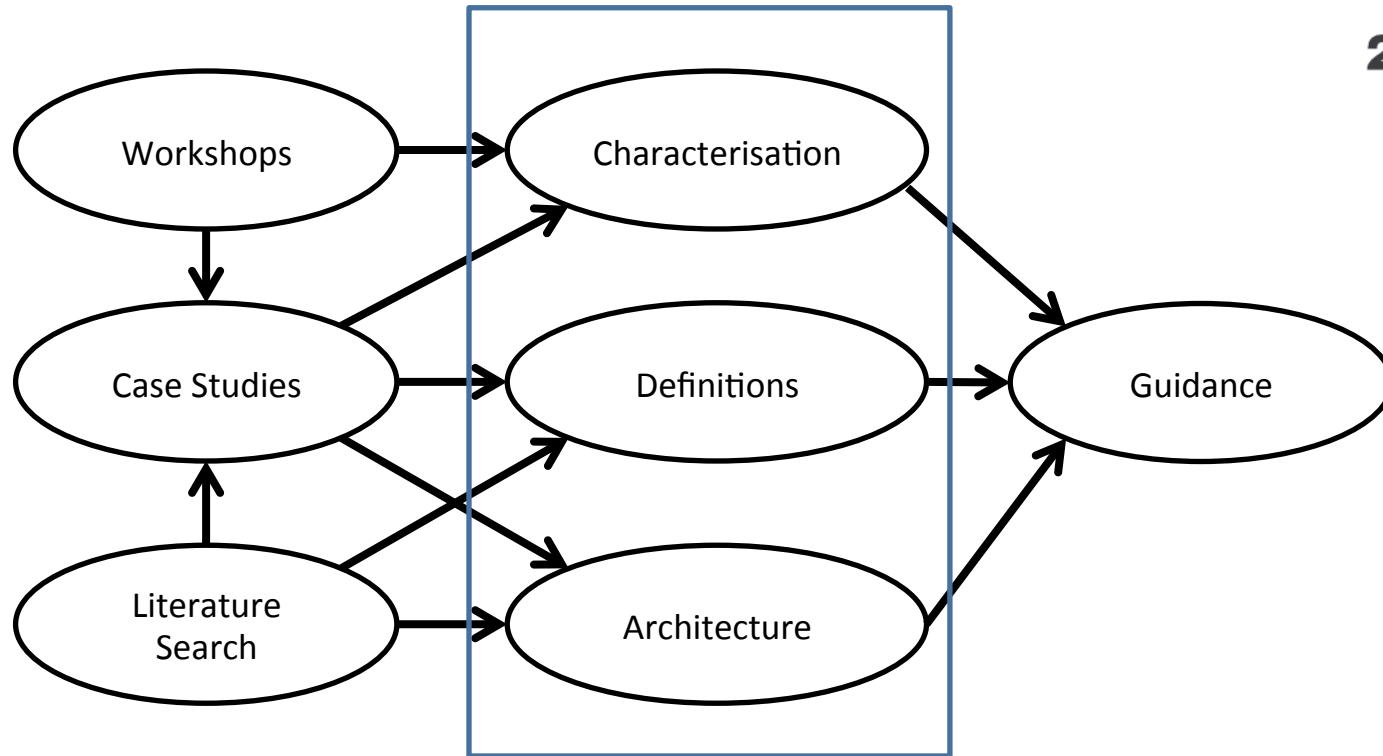# Medical Services: (based on Garnier et al)

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What's Next?

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Workshops → Characterisation → Guidance
Case Studies → Definitions → Guidance
Literature Search → Architecture → Guidance
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Summary

- What is a Service?
  - Definitions
- What types of Service are there?
  - Product-Service Systems
- What characterises a Service?
  - Characteristics
- How can we engineer Services?
  - Architectures
  - Lifecycles
- What's next?

Questions?