

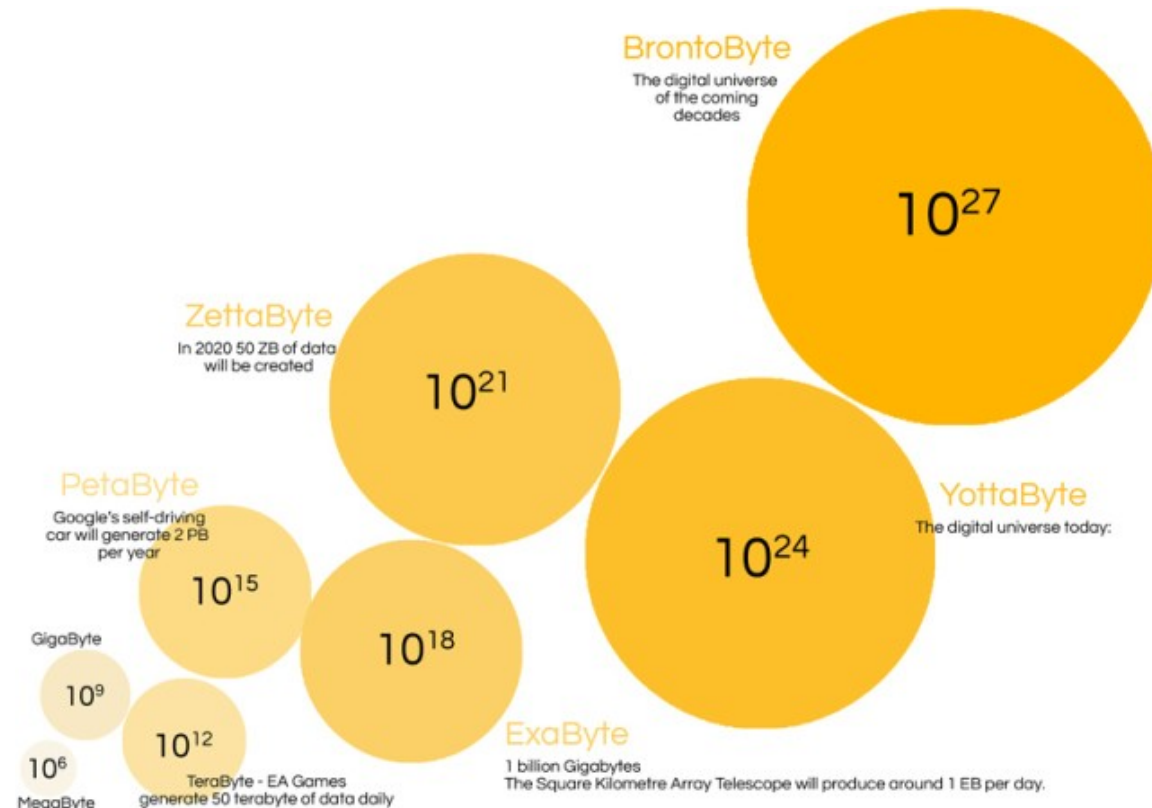
Synaptic Assimilator

Andreas F. Vermeulen
30 August 2015

Real World Activity:

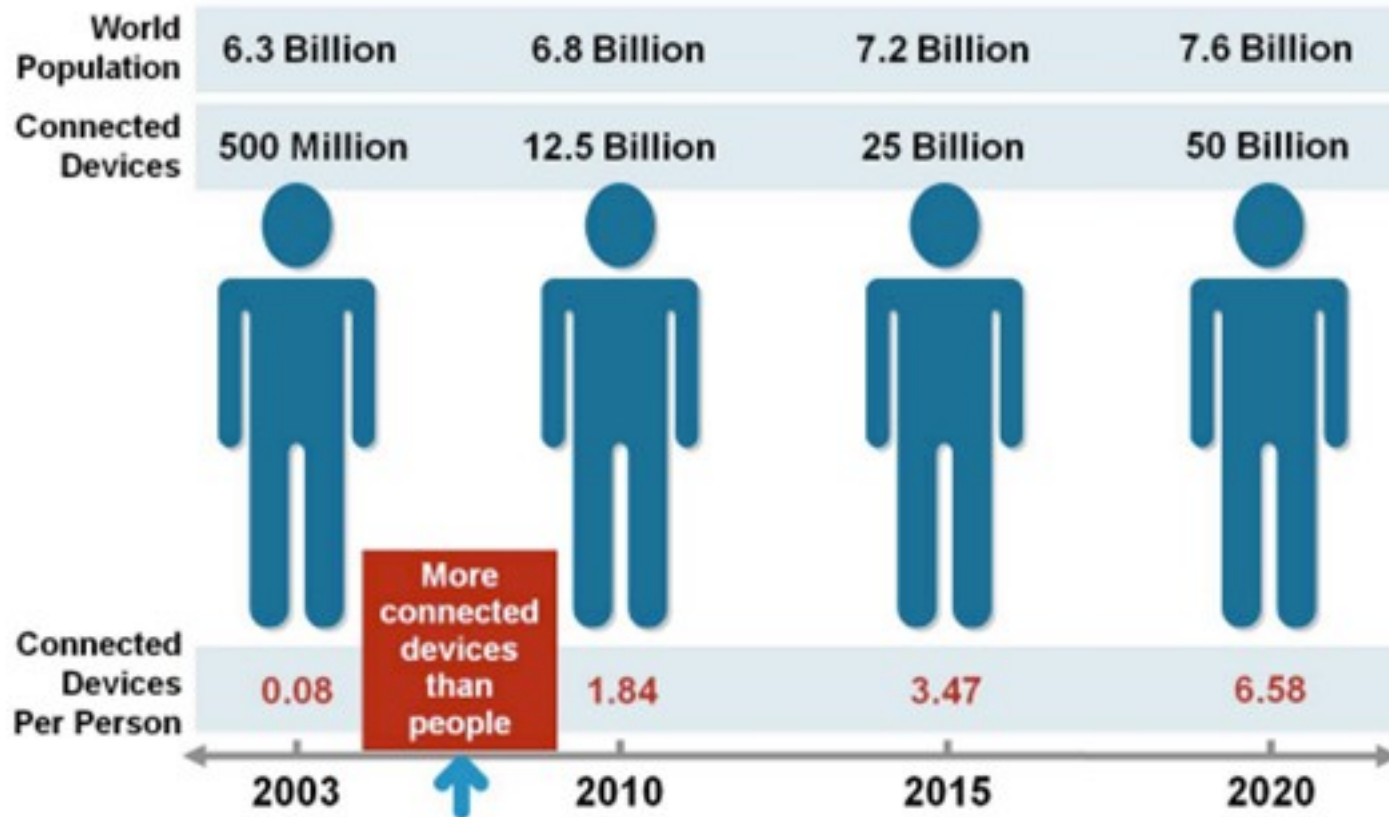
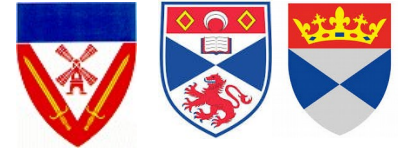


Every day, we create 2.5 quintillion bytes of data — 90% of the data in the world today created in last two (IBM,2015)



Big data services is set to climb at a compound annual growth rate of 50 per cent over the next five years. (Ovum, 2015)

Real World Activity:



Source: Cisco IBSG, April 2011

Big data generators are machines not people. (Cisco, 2015)

Resulting Problem:

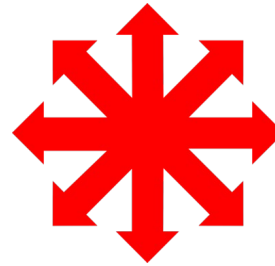
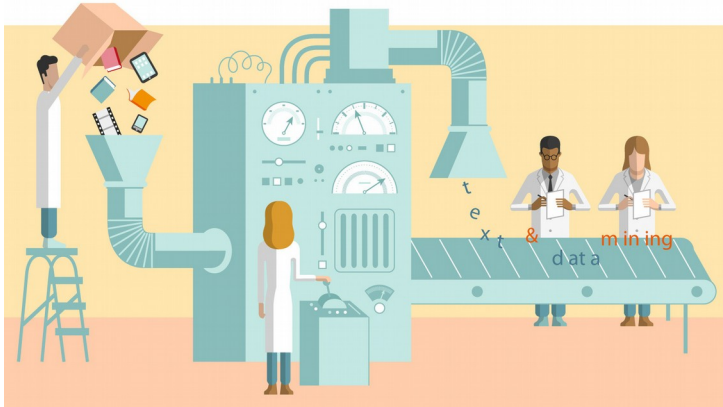


Data Science can no-longer keep ahead of the data generation wave.

Possible Solution:



Rapid Information Factory



Rapid Information Factory Framework

The framework guides the processing of data into information using pre-optimised processes.

Rapid Information Factory Cluster

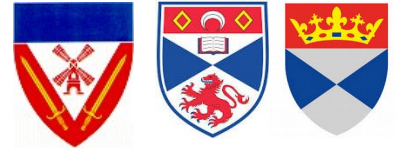
The cluster is a pre-optimised processing solution that is processing the data into information.



Research Question:

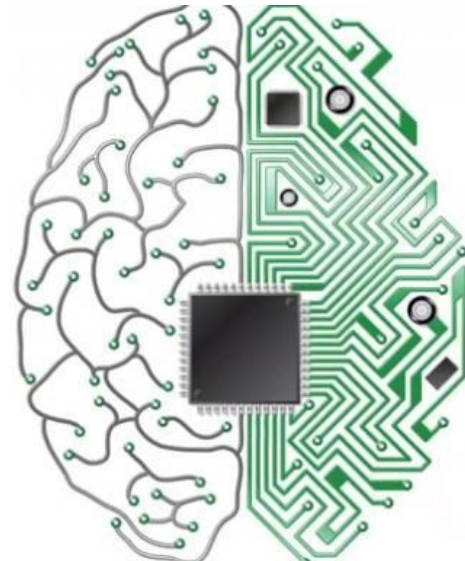
What happens when exascale computing executes data processing and computing solutions uses commodity building block and heterogeneous computing processes to convert data into information?





Exascale Computing:

Exascale computing is systems capable to support over one exaFLOPS of data processing.





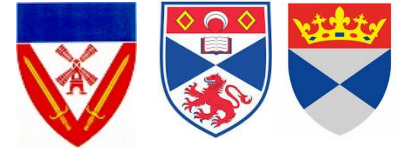
Synaptic Assimilator

The solution is a one million processor ecosystem that processes data sets in the exabyte (10^{18}) range and the system uses embedded heterogeneous computing that is assembled by an artificial control system from a range of pre-optimised processing building blocks.



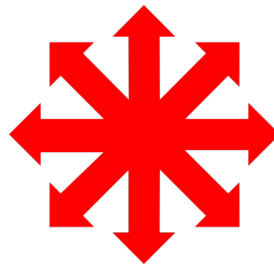
(Automatic data processing using machine learning and decision models)

Rapid Information Factory

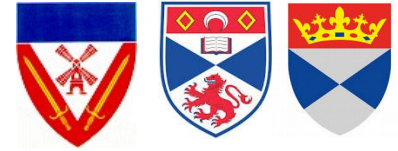


The concept of a factory is well known to the world of mass production in manufacturing.

The RIF uses the same principals that is used in mass production in the commodity market to guide the processing of the data into information.



(Create a work flow of smaller activities to achieve bigger goals)



Rapid Information Factory

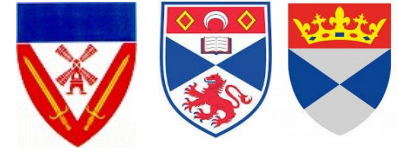
The factory consists of two halves:

Rapid Information Factory Framework

The framework guides the processing of data into information using pre-optimised processes.

Rapid Information Factory Cluster

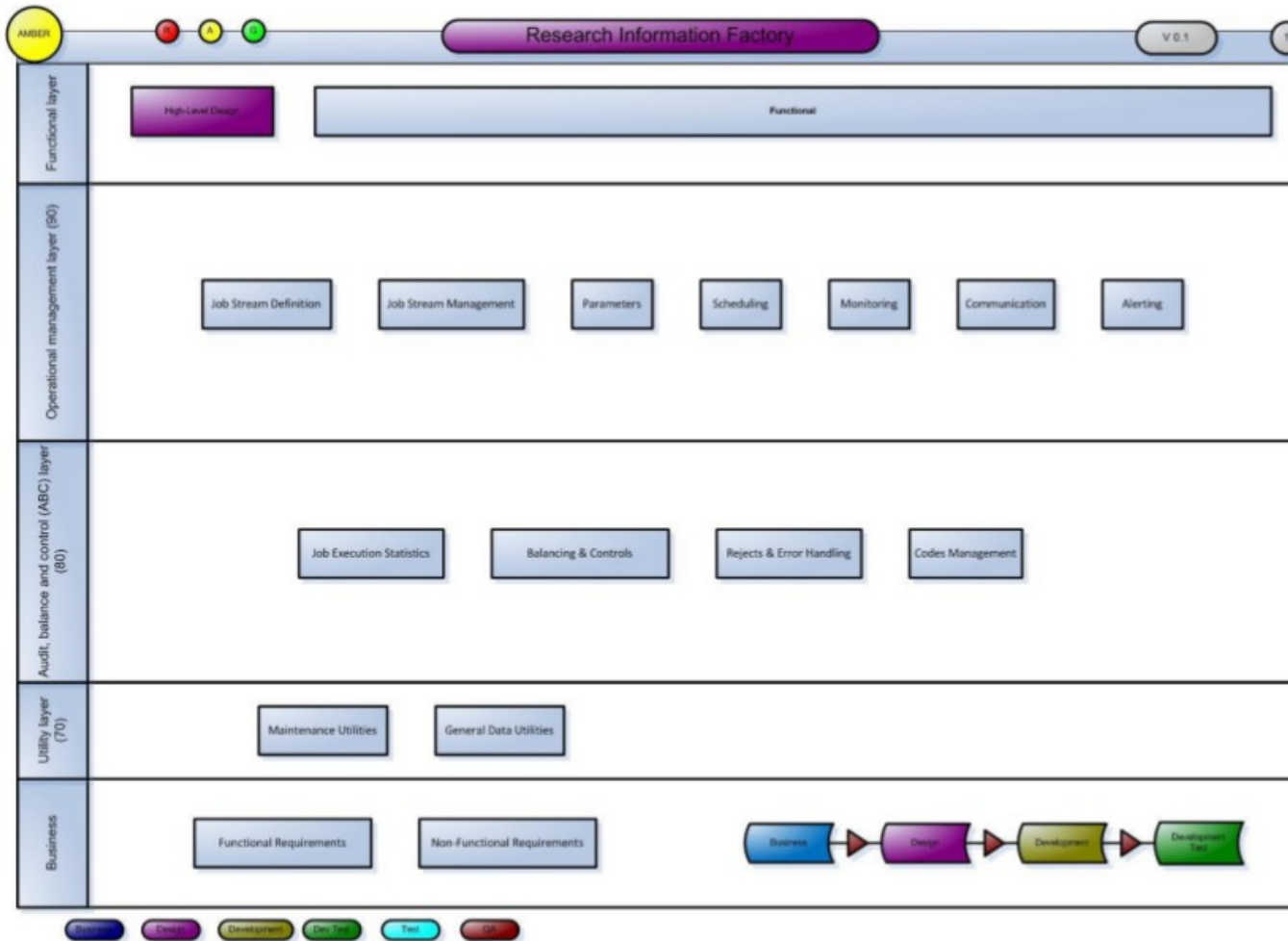
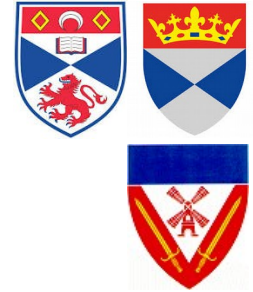
The cluster is a pre-optimised processing solution that is processing the data into information.



Rapid Information Factory Framework

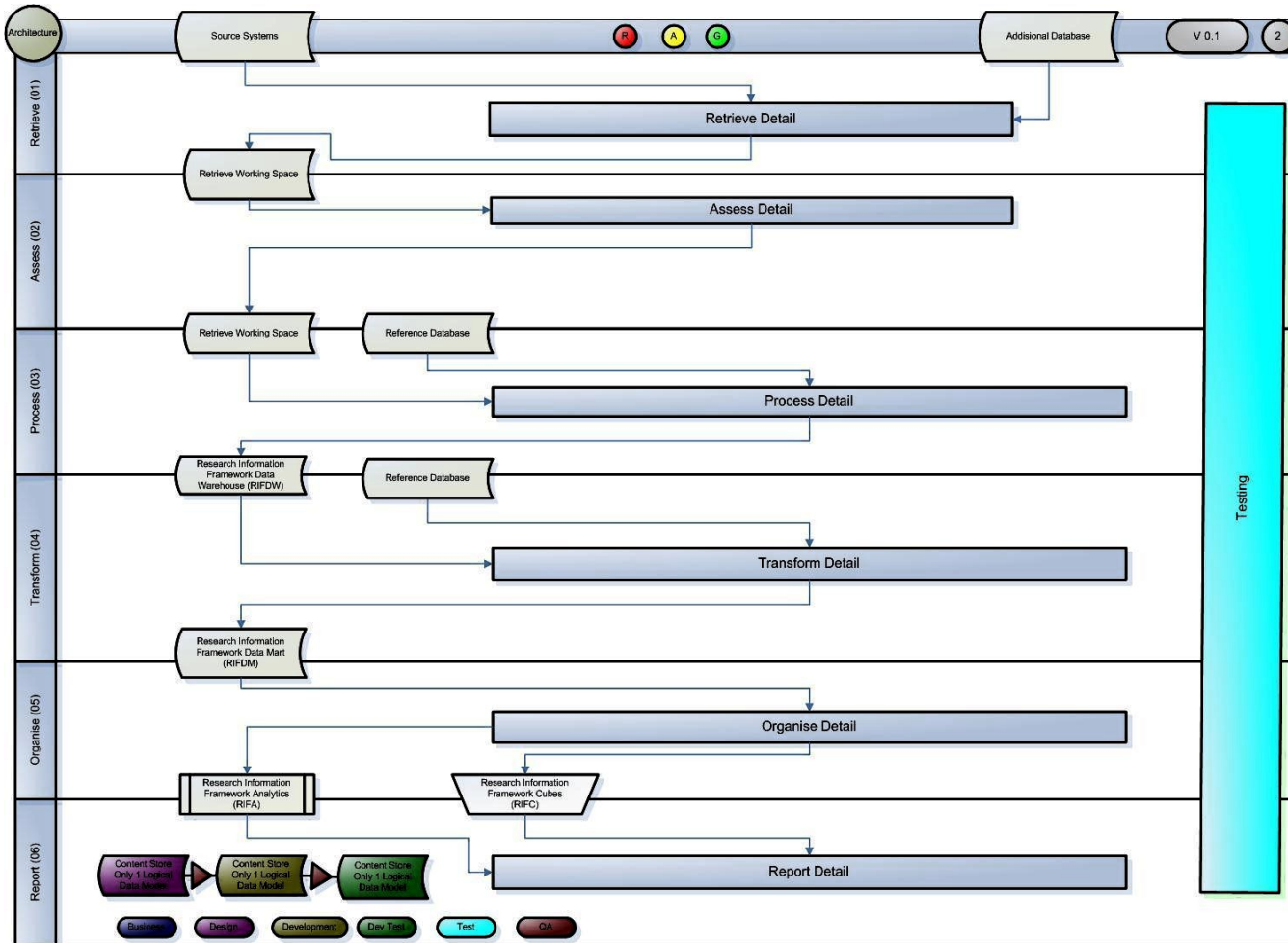
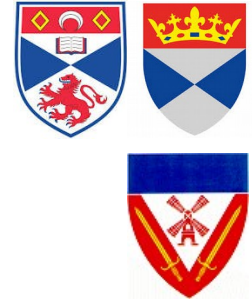
The framework guides the processing of data into information using pre-optimised processes.

Rapid Information Factory Framework



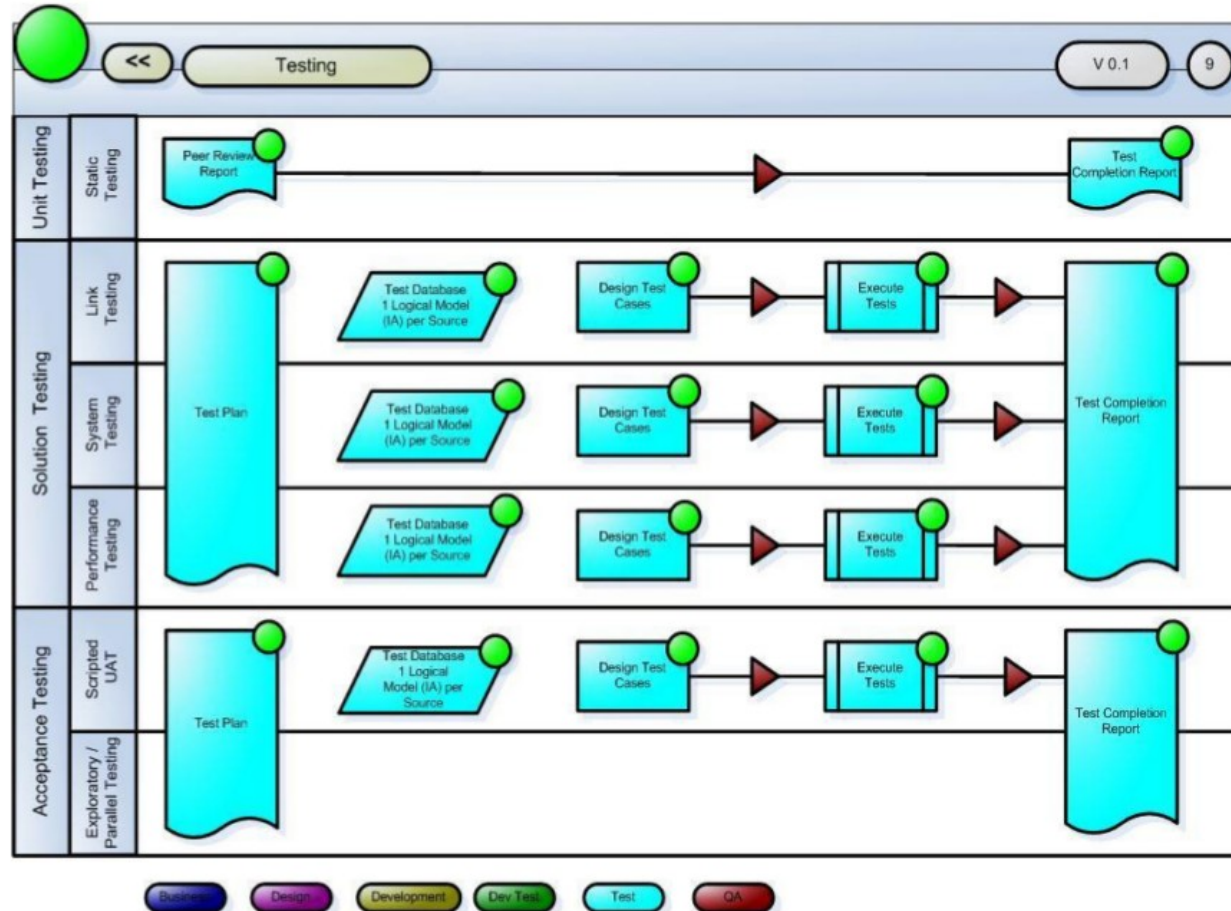
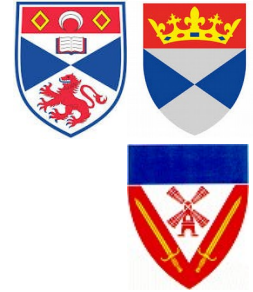
(Five Areas of Management Controls)

Rapid Information Factory Framework



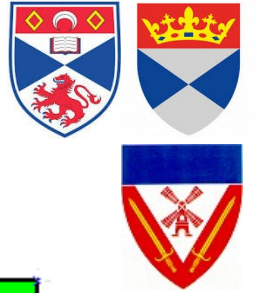
(Six Layers of Processing)

Rapid Information Factory Framework

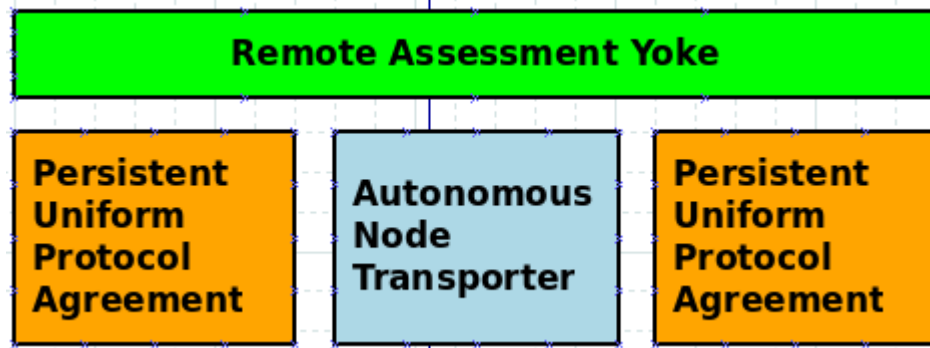


(Areas of Quality Assurance)

Rapid Information Factory Framework



Remote Work Cell

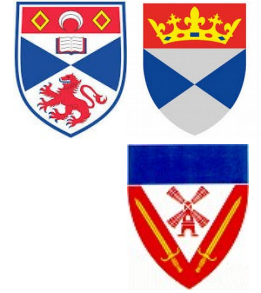


The RWC is a group of processes that has a singular purpose of work in the same manner than a Lean Work Cell.

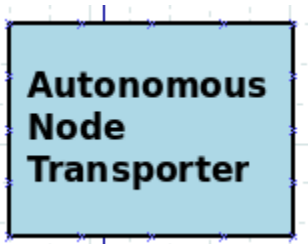
The cell consists of four parts:

- RAY
- PUPA (inbound)
- ANT
- PUPA (Outbound)

Rapid Information Factory Framework



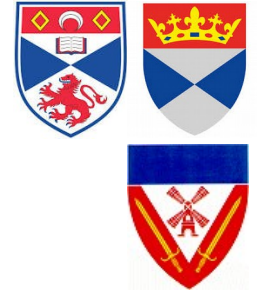
Autonomous Node Transporter



The ANT is the software stack required to run any predefined hardware process and software combination from the RIFF library of processing configurations.

(Script to create/configure specific processing unit)

Rapid Information Factory Framework



Persistent Uniform Protocol Agreement



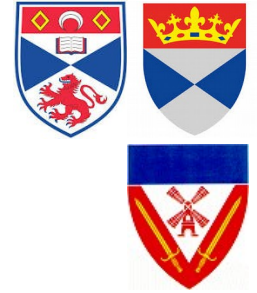
The PUPA is the software stack required to run any predefined Algorithms that is formed from self-contained step-by-step set of operations to be performed.

PUPA performs calculation, data processing, and automated reasoning using uniform processes from the RIFF library of processing configurations.

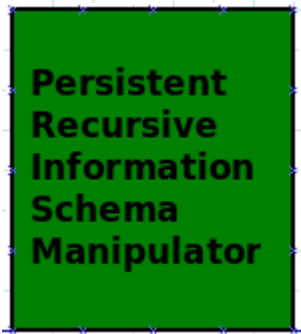
PUPA can consist of other PUPA to form processing chains.

(Script for performing specific processing)

Rapid Information Factory Framework



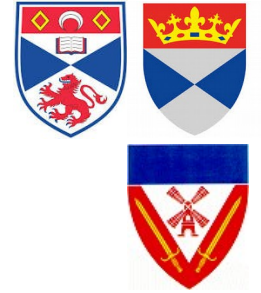
Persistent Recursive Information Schema Manipulator



The PRISM is the main process that drives a specific chain of processes that together forms the required work cells to convert the data into information by applying the RIFF rules of processing.

(Script for performing specific group of processing)

Rapid Information Factory Framework



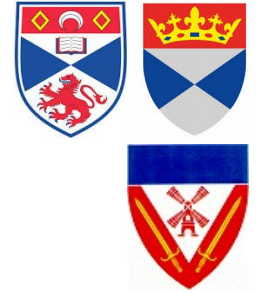
Remote Assessment Yoke

Remote Assessment Yoke

The RAY is a “Poka-yoke” from Lean manufacturing to avoid mistakes in the work cells while conversion of the data into information by applying the RIFF rules of processing.

(Script for performing specific monitoring of processing)

Rapid Information Factory Framework



Node Extractor and Schema Transformer

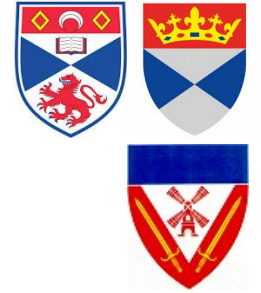
Node Extractor and Schema Transformer

The NEST is a specialised software stack required to enable a ANT to communicate with a specific type of data source.

NEST will be designed for data sources and published in as uniform processes in the RIFF library.

(Script for performing extraction of data from specific data source)

Rapid Information Factory Framework



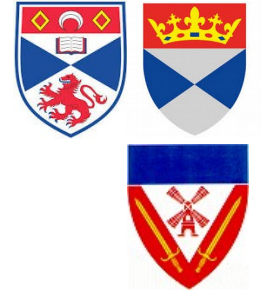
Autonomous Logical Agreement Transport Executor

Autonomous
Logical
Agreement
Transport
Executor

The ALATE is a specialised software stack required to enable a ANT to discover which PUPAs will be required to perform the R-A-P-T-O-R process for a new NEST.

(Script for performing specific processing)

Rapid Information Factory Framework



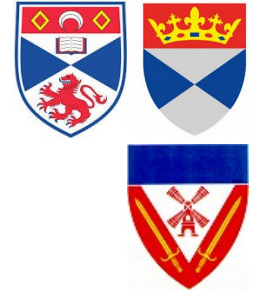
Sequential Converter into Ontology for Uniform Transport

Sequential
Converter into
Ontology for
Uniform
Transport

The SCOUT is a specialised software stack required to enable a ANT to convert meta data from a NEST into HORUS PUPA for R-A-P-T-O-R process to use.

(Script for performing specific processing)

Rapid Information Factory Framework



Rapid Artificial Intelligence Data Extract Routine



The RAIDER is a specialised software stack required to enable a ANT to mine data from a NEST into HORUS PUPA procedures for R-A-P-T-O-R process to use.

(Script for performing specific processing)



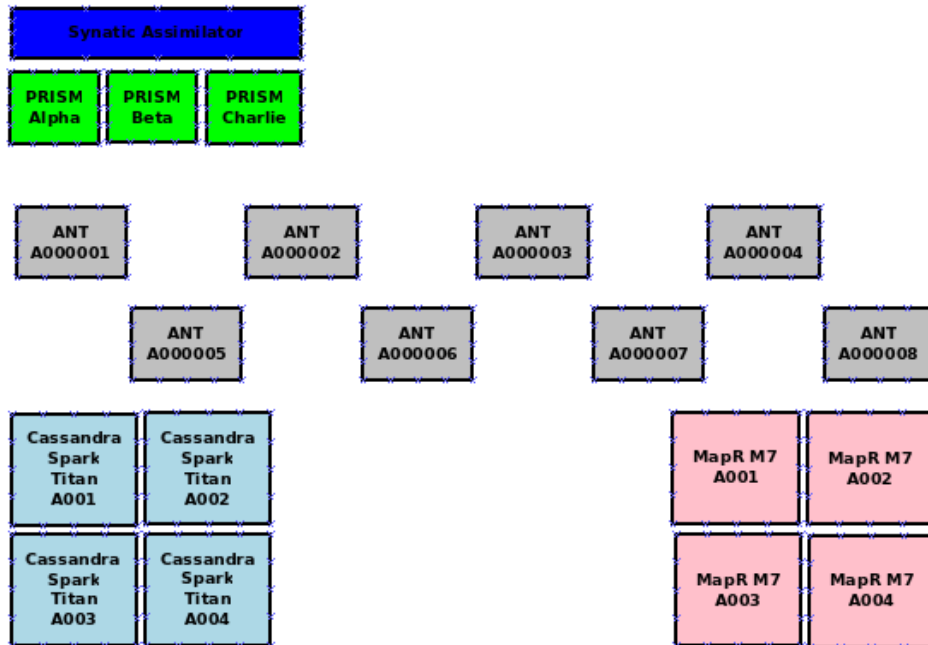
Rapid Information Factory Cluster

The cluster is a pre-optimised processing solution that is processing the data into information.

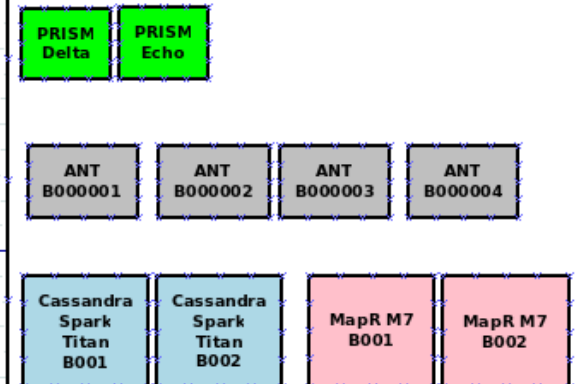


Rapid Information Factory Cluster

Rack Alpha



Rack Beta





Rapid Information Factory Cluster





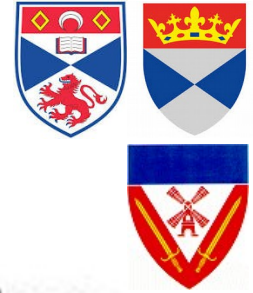
Thank you

Synaptic Assimilator

Andreas F. Vermeulen

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Rapid Information Factory Framework



**5S is a workplace organization technique composed for five primary phases:
Sort, Set In Order, Shine, Standardize, and Systematize.**



SORT

**Keep only
necessary items
in the workplace.**



SET IN ORDER

**Arrange items
to promote
efficient workflow.**



SHINE

**Clean the work
area so it is
neat and tidy.**



STANDARDIZE

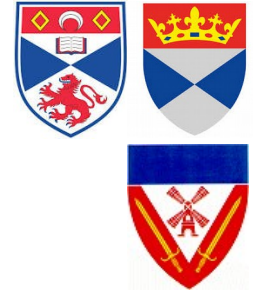
**Set standards
for a consistently
organized workplace.**



SYSTEMATIZE

**Maintain
and review
standards.**

Rapid Information Factory Framework



D	Defects
O	Overproduction
W	Waiting
N	Non-Utilized Talent
T	Transportation
I	Inventory
M	Motion
E	Extra-Processing



Defects

Efforts caused by rework, scrap, and incorrect information.



Overproduction

Production that is more than needed or before it is needed.



Waiting

Wasted time waiting for the next step in a process.



Non-Utilized Talent

Underutilizing people's talents, skills, & knowledge.



Transportation

Unnecessary movements of products & materials.



Inventory

Excess products and materials not being processed.



Motion

Unnecessary movements by people (e.g., walking).



Extra-Processing

More work or higher quality than is required by the customer.



Time
People
Organisation
Location
Event

