



LIAISE

Wondermar II workshop

Malmo

12th September 2002

Rob Wheeler (BMT)

Local Intelligent **A**gent as Informed **S**ales **E**xpert

- Part of the IST Programme
- 36 month duration
- Completion this month (Final review next week)



Core Ideas



- Creation of supply chains on-the-fly
- Not restricted to any vertical market
- Uses portable software standards
- Scalable to any size value chain
- Configuration Engine and GUI
 - Helps client define specification
- Decision Module
 - Finds best tender to match client specification



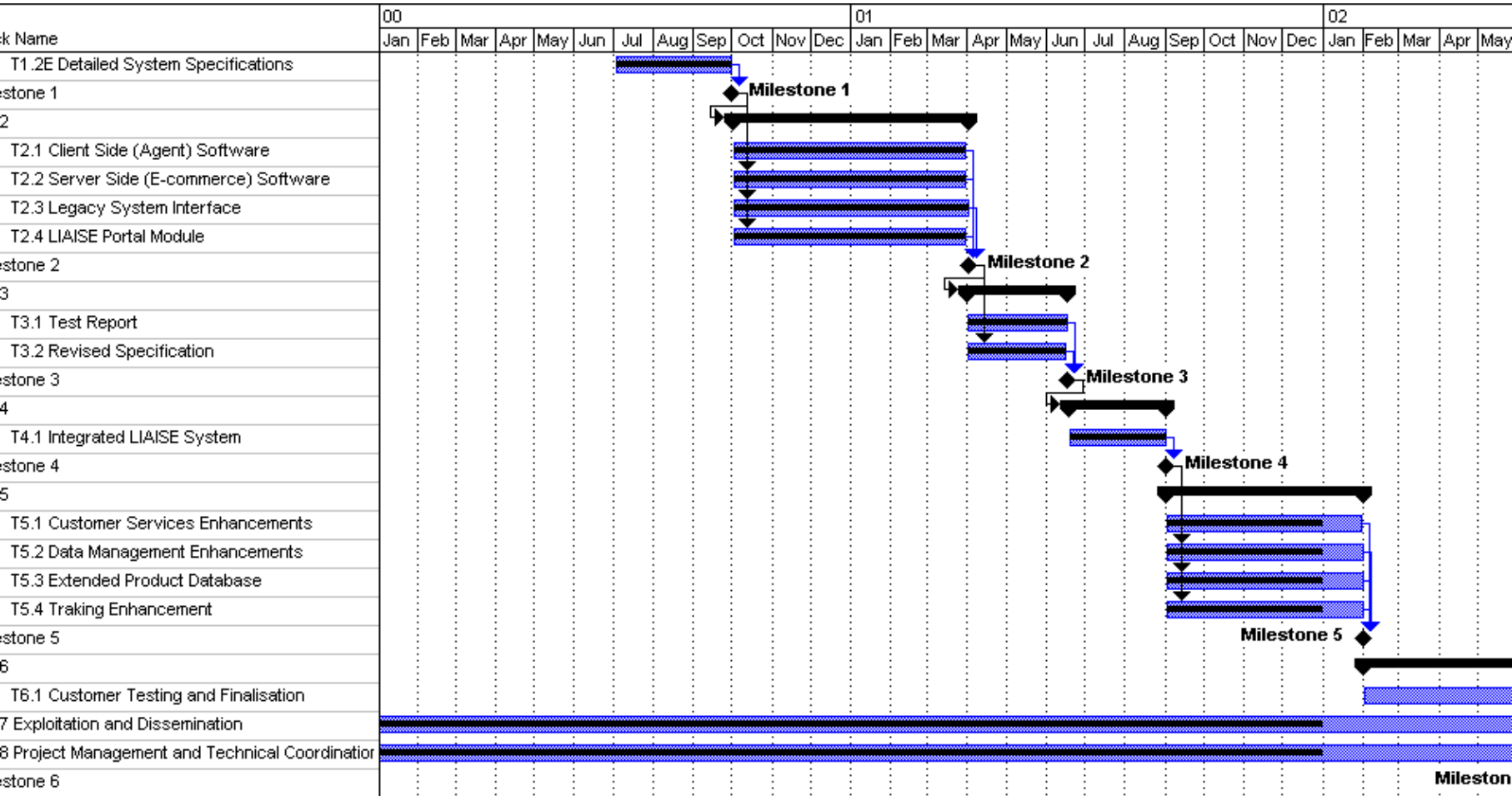
LIASE Consortium



- Agents and Agent-Supporting Software
 - Provided by BMT
 - Configuration Agent
 - Agent for finding best specification quotation
- Communications Framework
 - Provided by TXT
- Interface To Legacy Software
 - Provided by Siemens-Orsi
- Web Portal and Directory
 - Provided by EURODYN
- Configuration GUI
 - Korona
- End Users
 - Korona, Siemens-Orsi, Procisa



Timeline



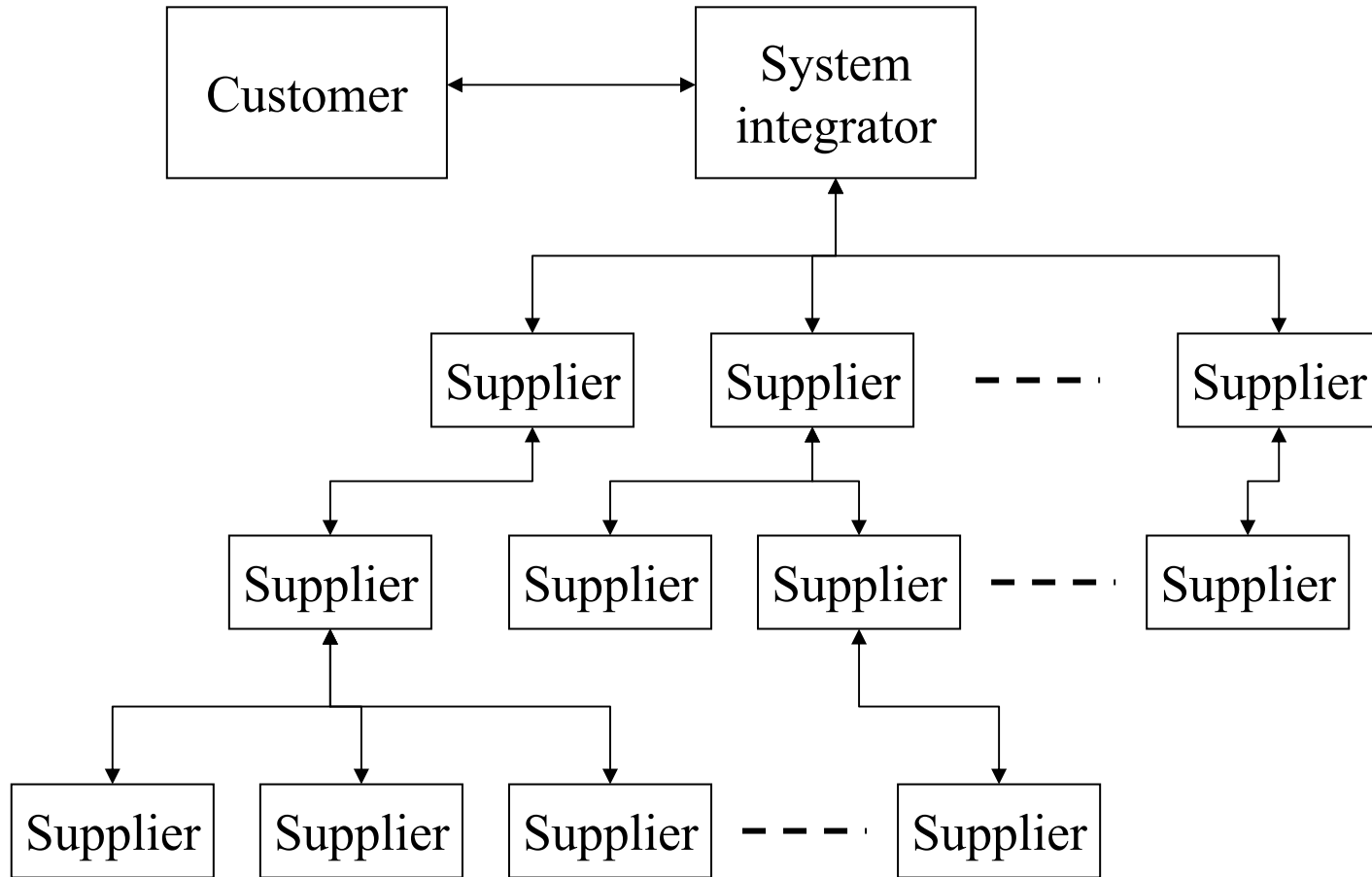


Technologies Used



- Java
 - <http://java.sun.com/>
- Jess – Java Expert System Shell
 - <http://herzberg.ca.sandia.gov/jess/>
- XML - Extensible Markup Language
 - <http://www.w3.org/XML/>
- SOAP – Simple Object Access Protocol
 - <http://www.w3.org/TR/SOAP/>

High Level Architecture

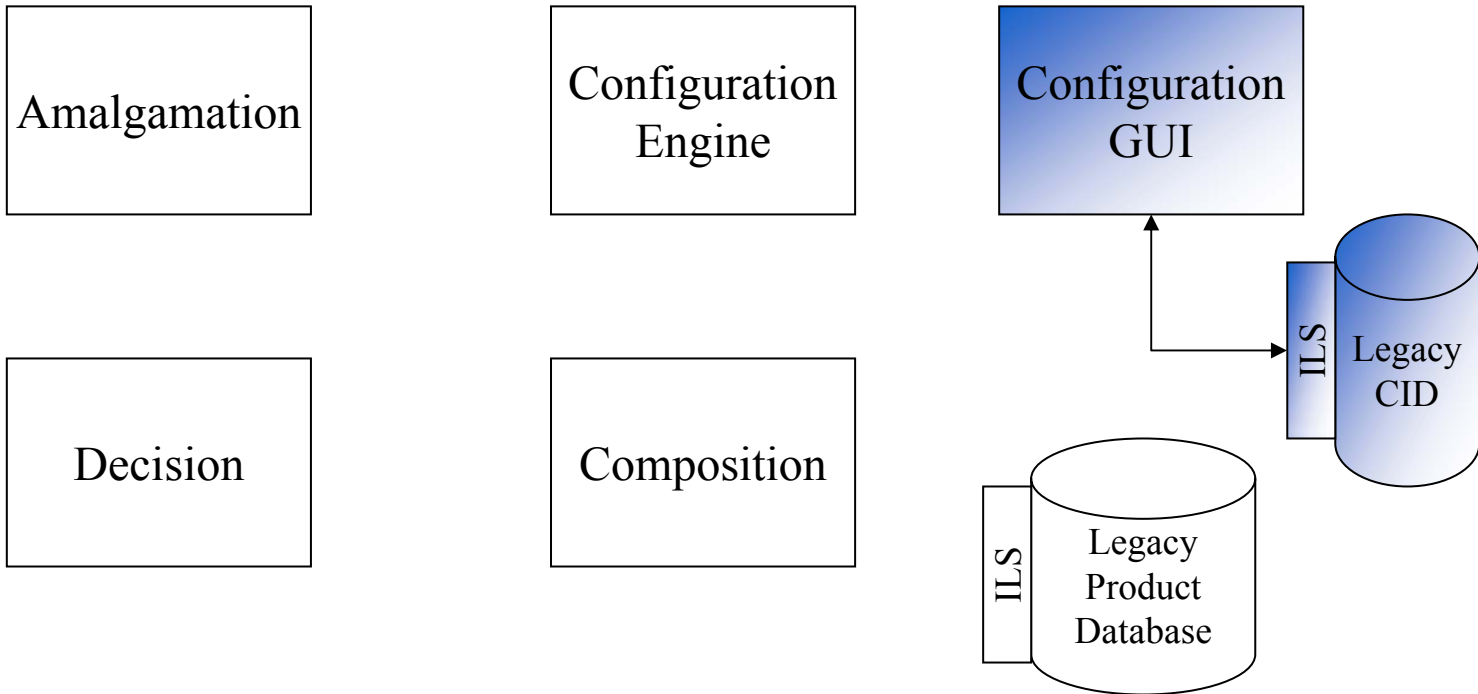




Liaise Node Architecture



Communication (from Previous Node)



Communication (to next Node)



Configuration GUI



LIAISE ClientControlSystem (test1)

Project Graph Documentation

Project Elements Library

Libraries

- Automation Systems
 - PC
 - Printer
 - Comm. Cable
 - Signal Link
 - Sensor
 - PLC
 - Area
 - Network Card
 - RTU
 - Controller
 - SCADA_SOFTWARE
 - PressureTransmitter
 - TemperatureSensor
 - FlowAndLevel
 - Dummy Comm. Cable

Area

PC

Printer

PLC

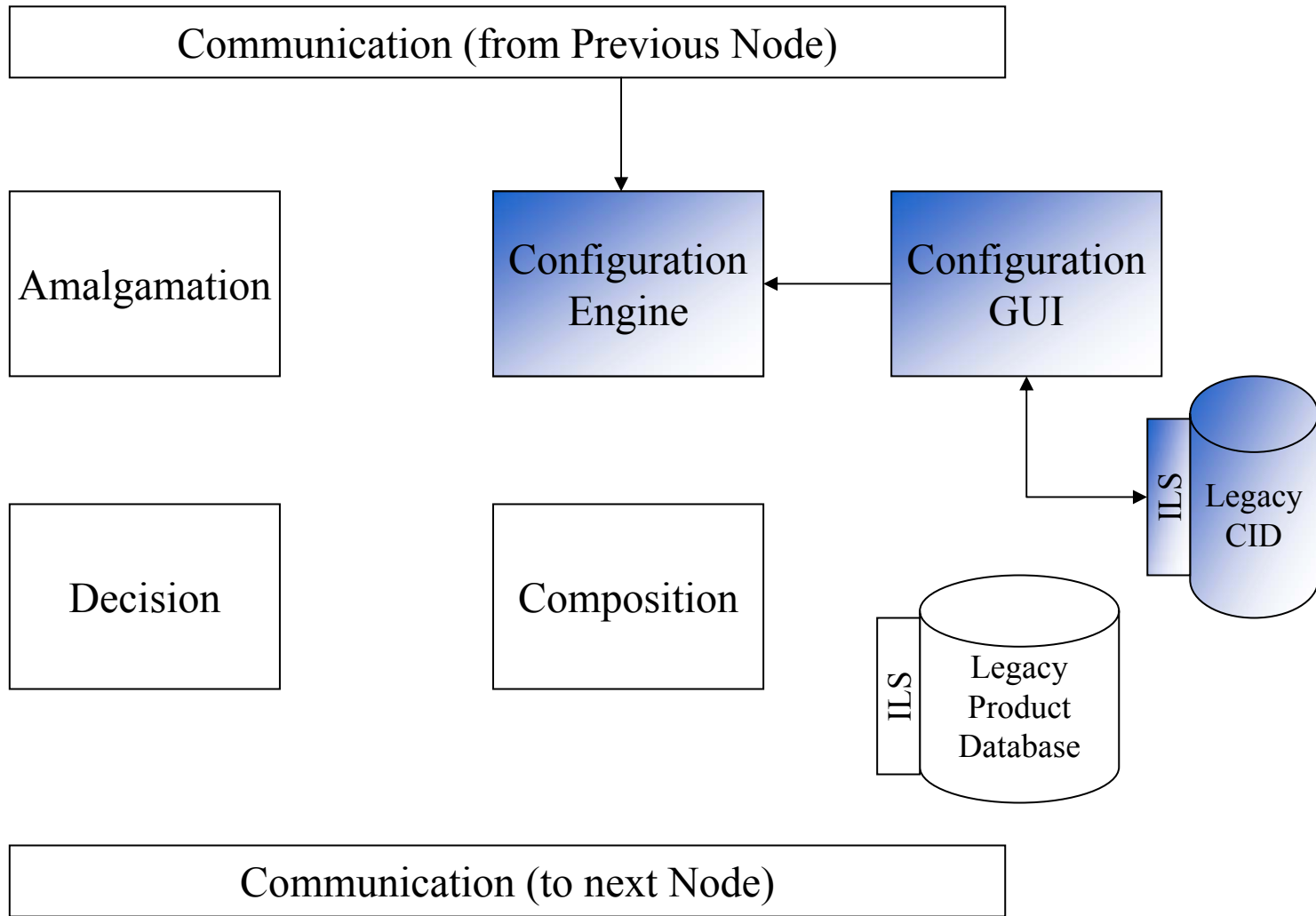
Specification of Demands Graph Editor Documentation

Control Status

Tuesday, 10.09.2002



Liaise Node Architecture





Configuration Engine



```
Configuration ConfigurationID="86" Request  
<Item ItemId="1031059520791"  
<TechnicalRequirements Conne
```

```
(defrule parentObjectsMinTemp  
  (Item (ItemId ?parentid) (Name ?n1))  
  (Item (ItemId ?id) (ParentId ?parentid) (Name ?n2))  
  (environment (ItemId ?parentid) (MinTemp ?min))  
  (test (neq ?min nil))
```

CEM

```
<TechnicalRequirements ConnectedDevice1_ID="0"  
ConnectedDevice2_ID="0" MinTemp="0" MaxTemp="40"  
AggressiveEnvironment="no" HumidEnvironment="no"  
VibratingEnvironment="no" ExplosiveEnvironment="no"...
```



Configuration Rules



Rules are a pattern and an action.

Eg, match two item's temperature ranges:

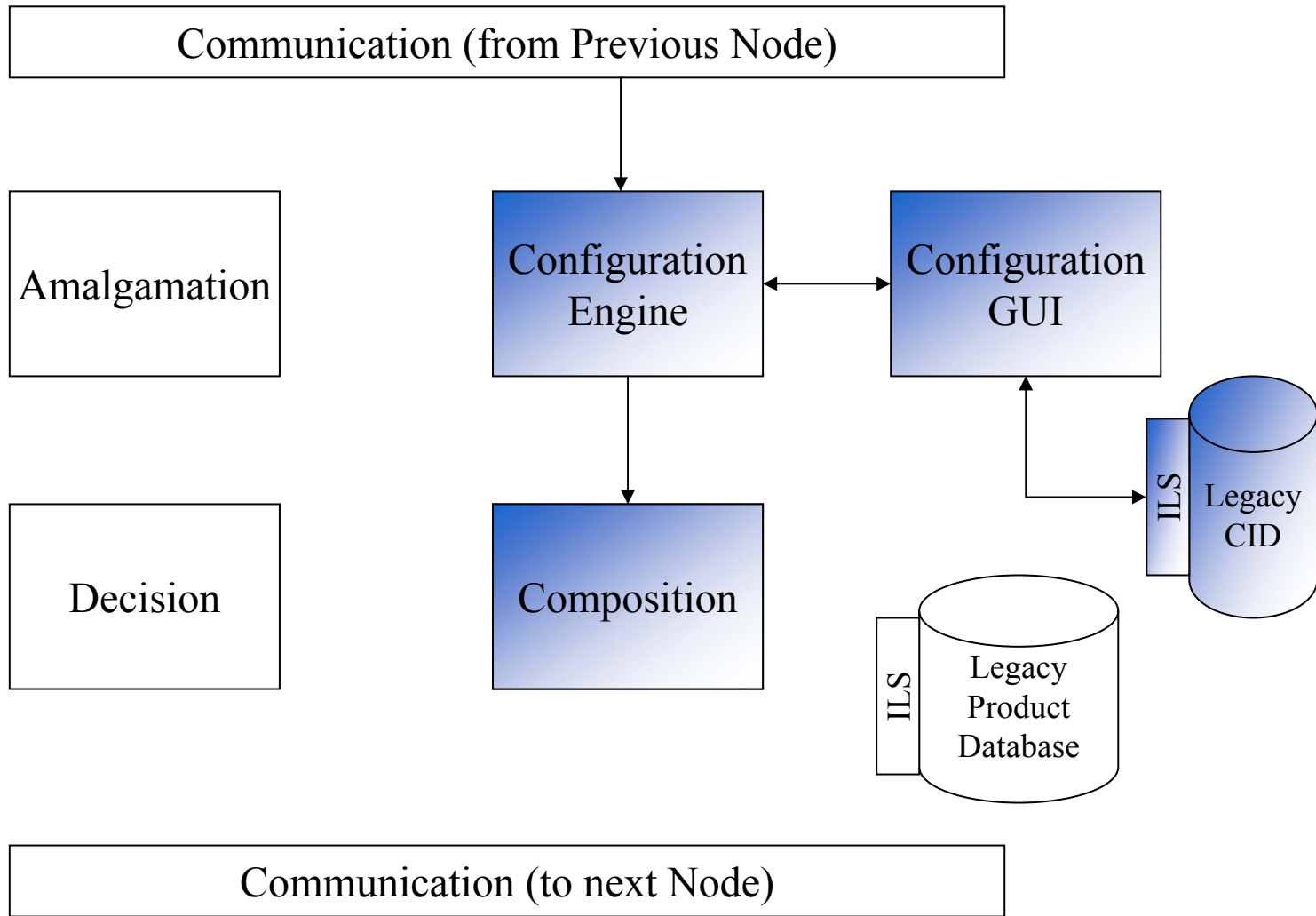
```
(defrule parentObjectsMinTemp
  (Item (ItemId ?parentid) (Name ?n1))
  (Item (ItemId ?id) (ParentId ?parentid) (Name ?n2))
  (environment (ItemId ?parentid) (MinTemp ?min))
  ?foo <- (environment (ItemId ?id) (MinTemp ?cmin))
  (test (> ?cmin ?min))
```

Then change one

```
=>
(modify ?foo (MinTemp ?min))
```



Liaise Node Architecture





Composition Module

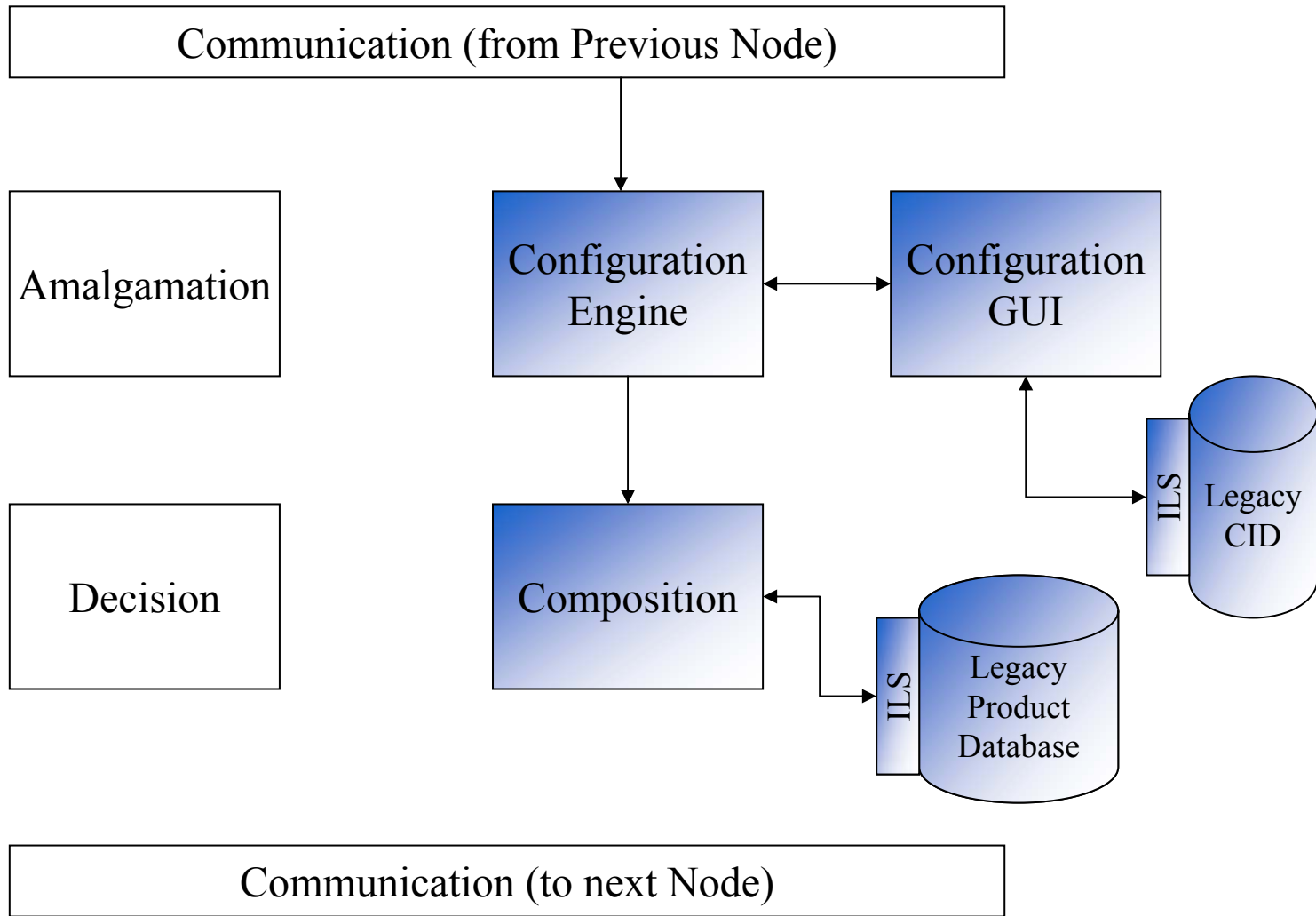


Identifies components available at the current node:

- Splits the configuration file into individual items
- Passes each item to the legacy systems
- Combines results back into configuration file

Components not available at the current node will be passed to other nodes for bids.

Liaise Node Architecture



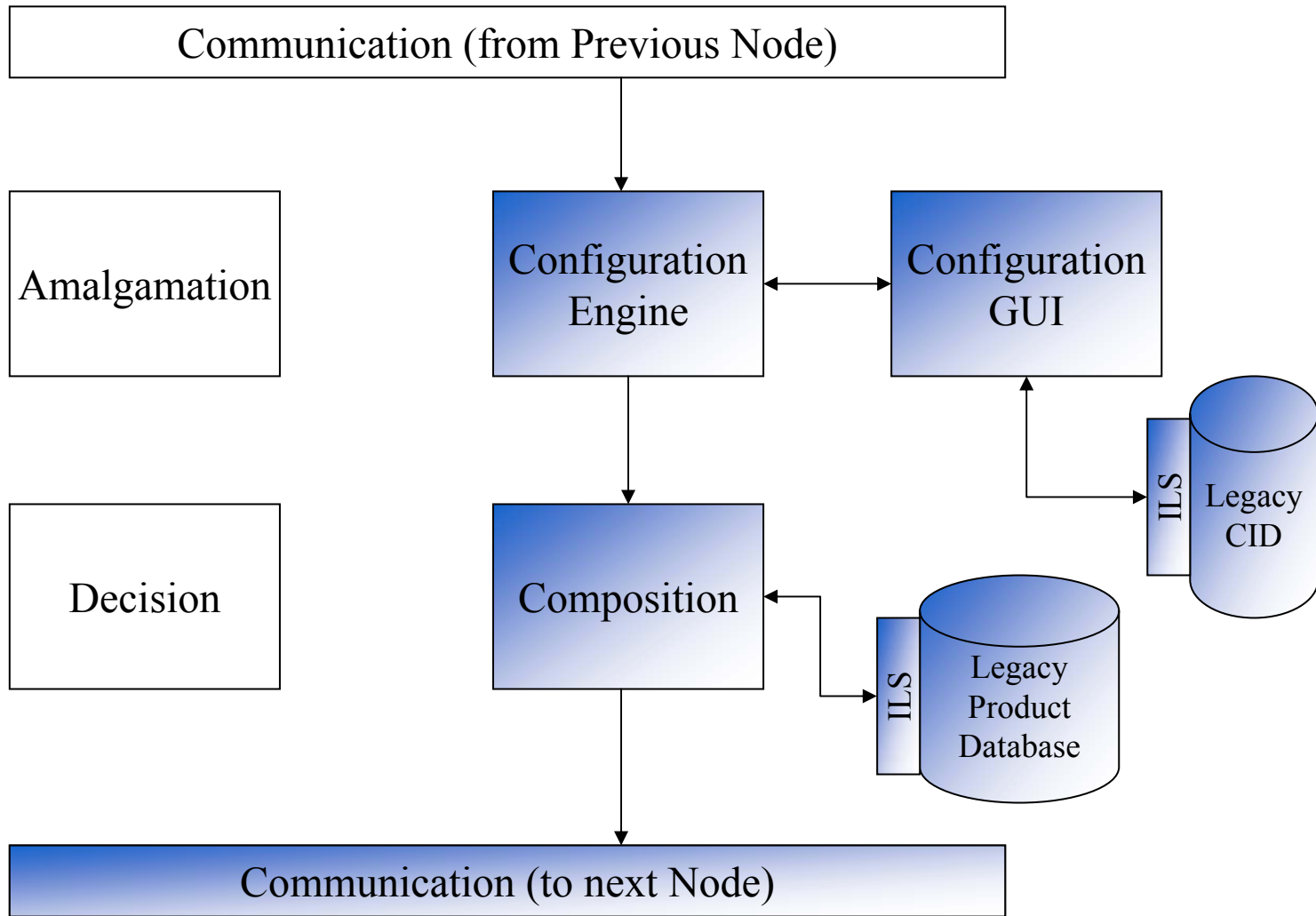


Legacy Interface

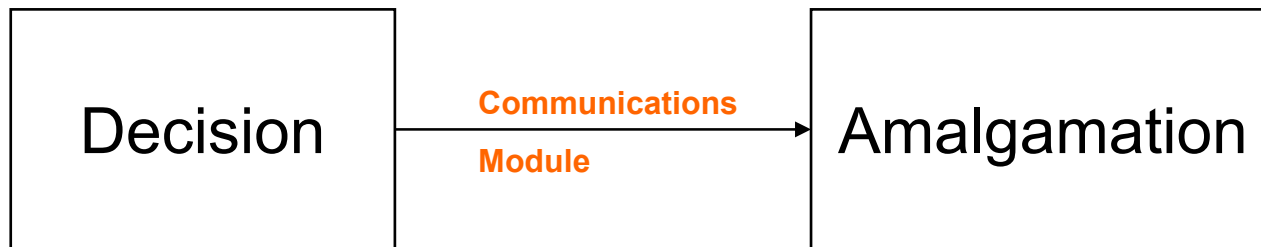


- The Interface to Legacy Systems (ILS) allows current databases to be integrated with Liaise.
- Data is passed in XML files.
- The XML format is not fixed and can be tailored to an application.

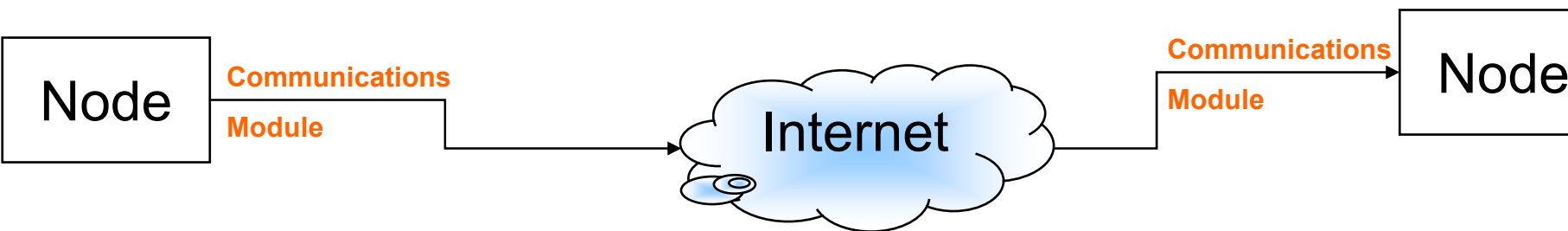
Liaise Node Architecture



- Controls data flow within the node

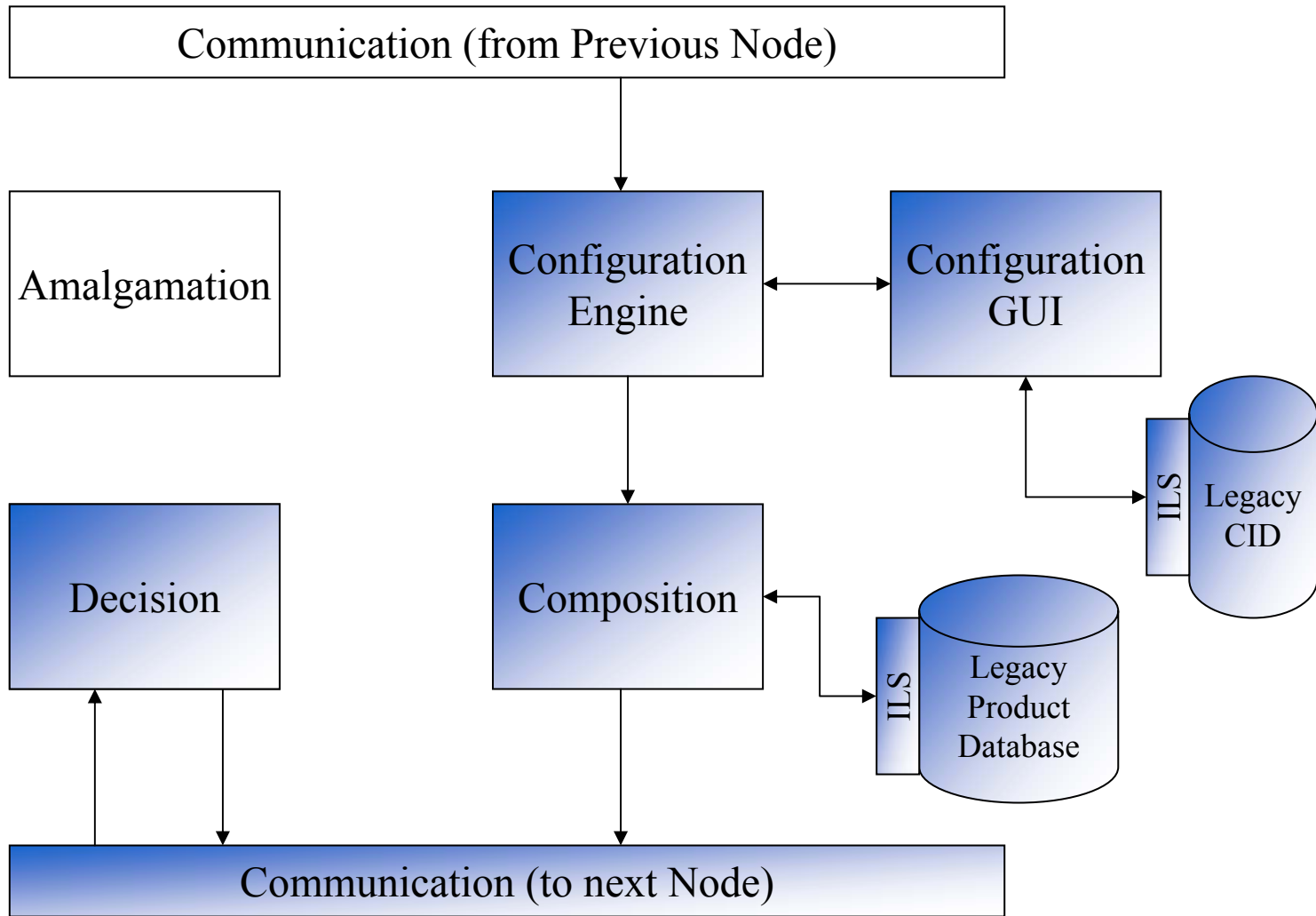


- Controls data flow between nodes





Liaise Node Architecture

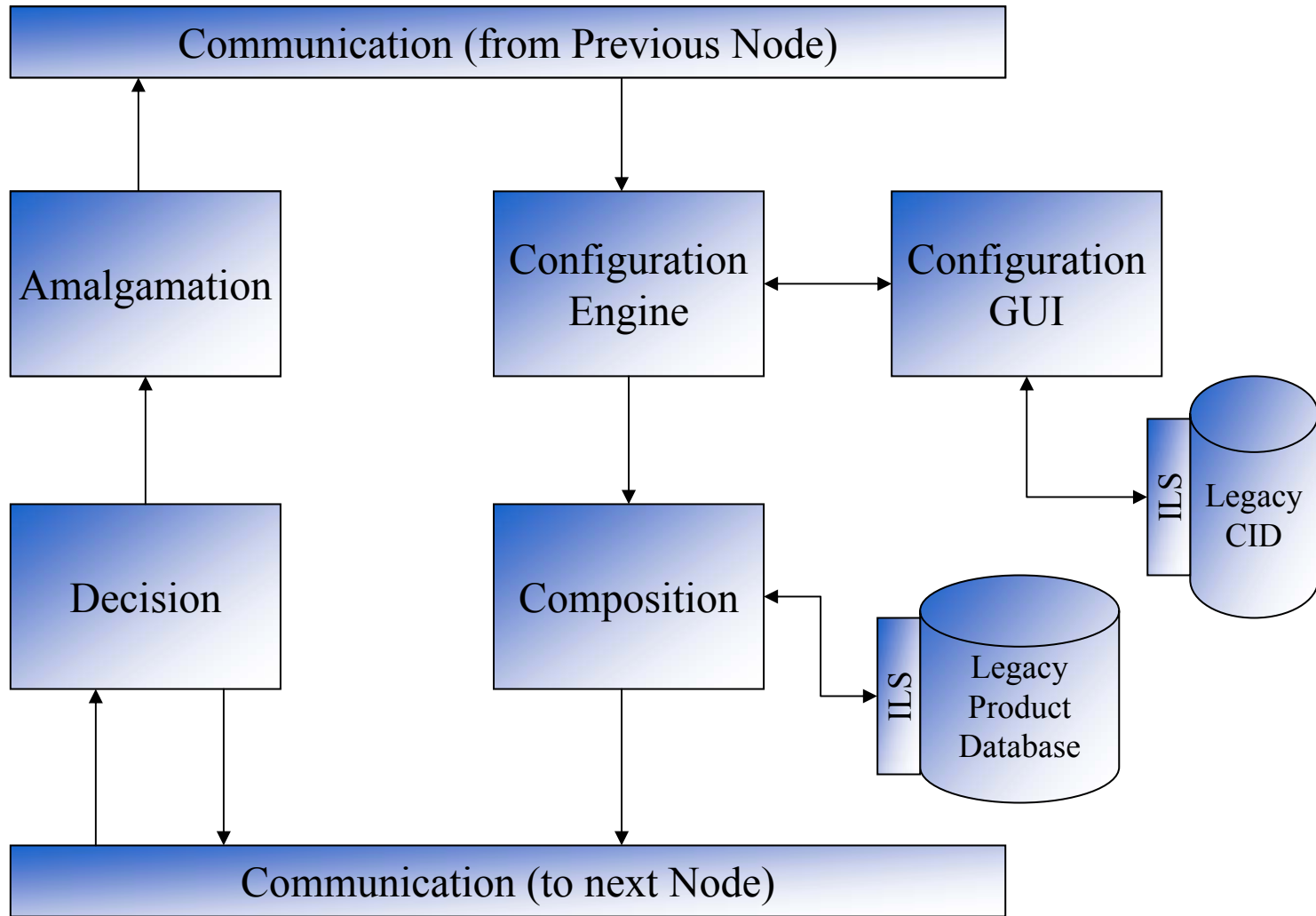


Decision Module

- Uses Multi-Attribute Utility Theory (MAUT) to identify the best response from downstream nodes
- Compares bids with respect to End User's priorities
 - End User sets 'weight' values against specifications (eg price, delivery date)
 - Absolute values are converted into ranges using 'fuzzy zones'
- If there is no clear winner, bids can be resubmitted

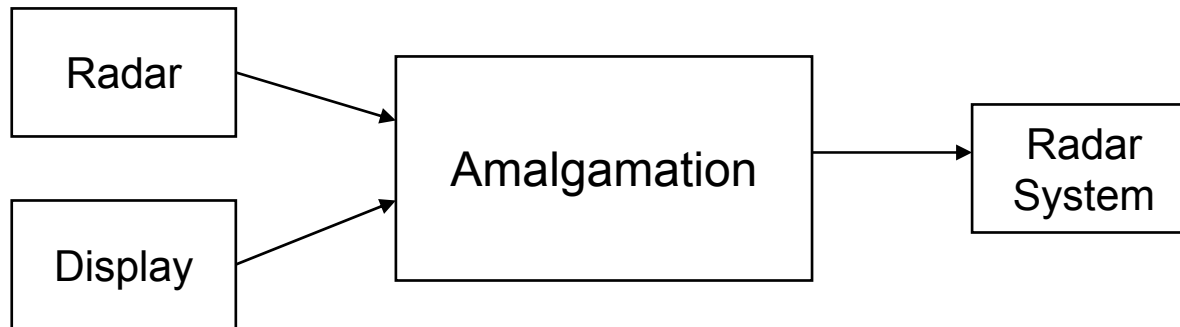


Liaise Node Architecture



Amalgamation Module

- Combines the outputs of the Decision and Composition Modules into a single response file
- Combines component parts into the parent item





Conclusions



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