Specialist Programme on Artificial Intelligence for IT & ITES Industry

Intelligent Process Automation (IPA)
Part 1/2

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Singapore e-Government Leadership Centre
National University of Singapore

Transform
Lead
Inspire

Agenda

1.1 Process Automation

1.2 Process Automation Use Cases

1.3 Process Automation Using Local AI

1.4 Process Automation Using Local AI Workshop

1.1 PROCESS AUTOMATION

1.1 PROCESS AUTOMATION

- **Type of Processes**
  - 'Hard' Processes (e.g. manufacturing)
  - 'Soft' Processes (e.g. business operations)

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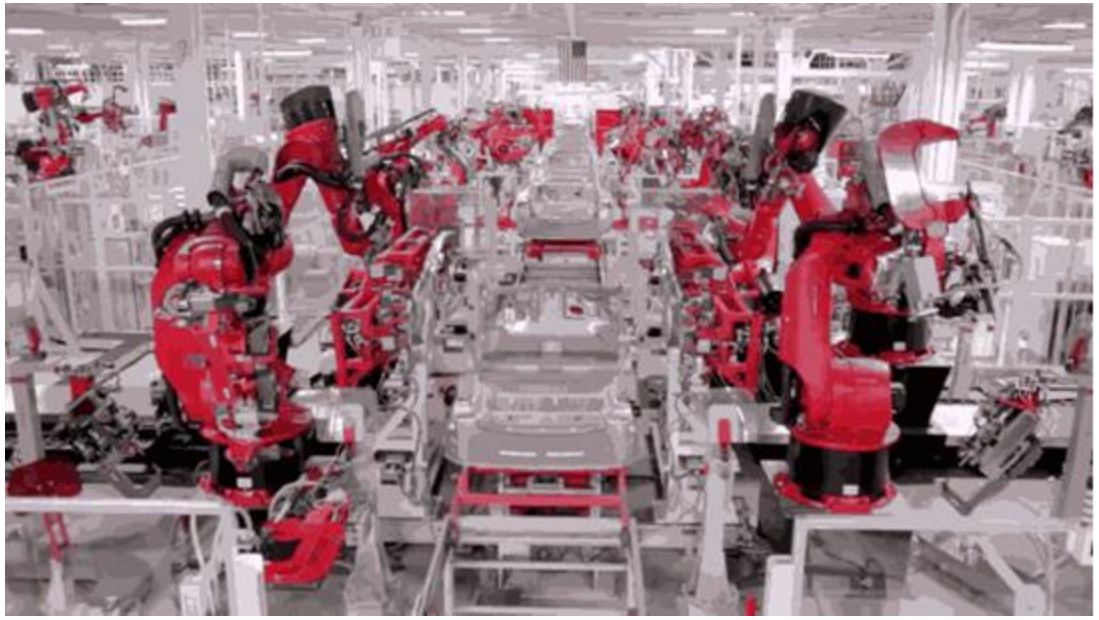
  - **'Hard' Processes (e.g. manufacturing)**
  - 'Soft' Processes (e.g. business operations)

1.1 PROCESS AUTOMATION

- **Automate 'Hard' Processes – Manufacturing**

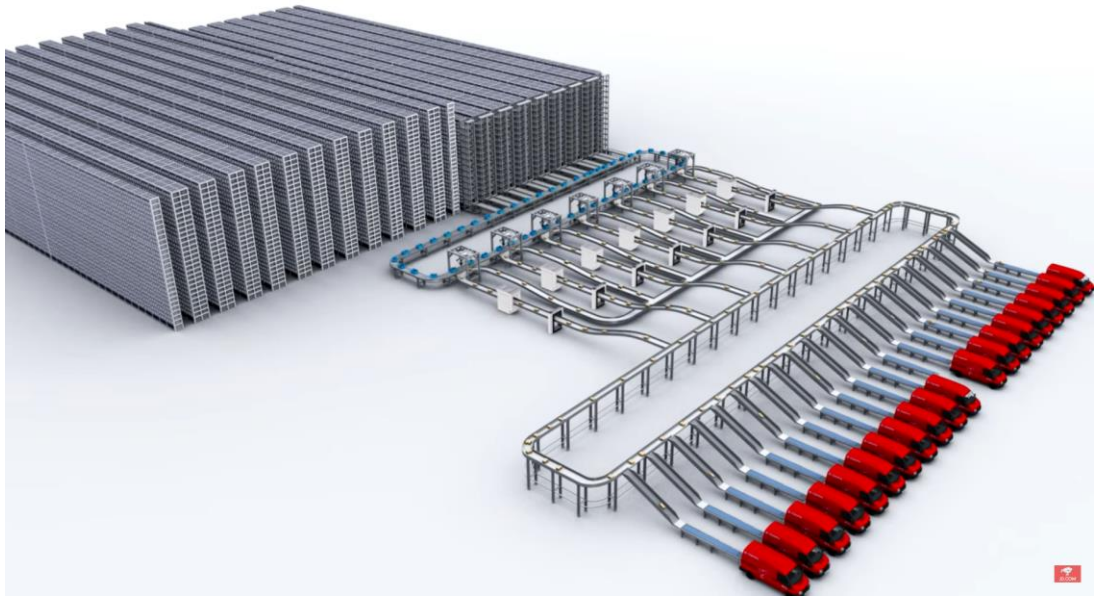


1.1 PROCESS AUTOMATION

- **Automate 'Hard' Processes – Logistics**

1.1 PROCESS AUTOMATION

- **Automate 'Hard' Processes – Logistics**



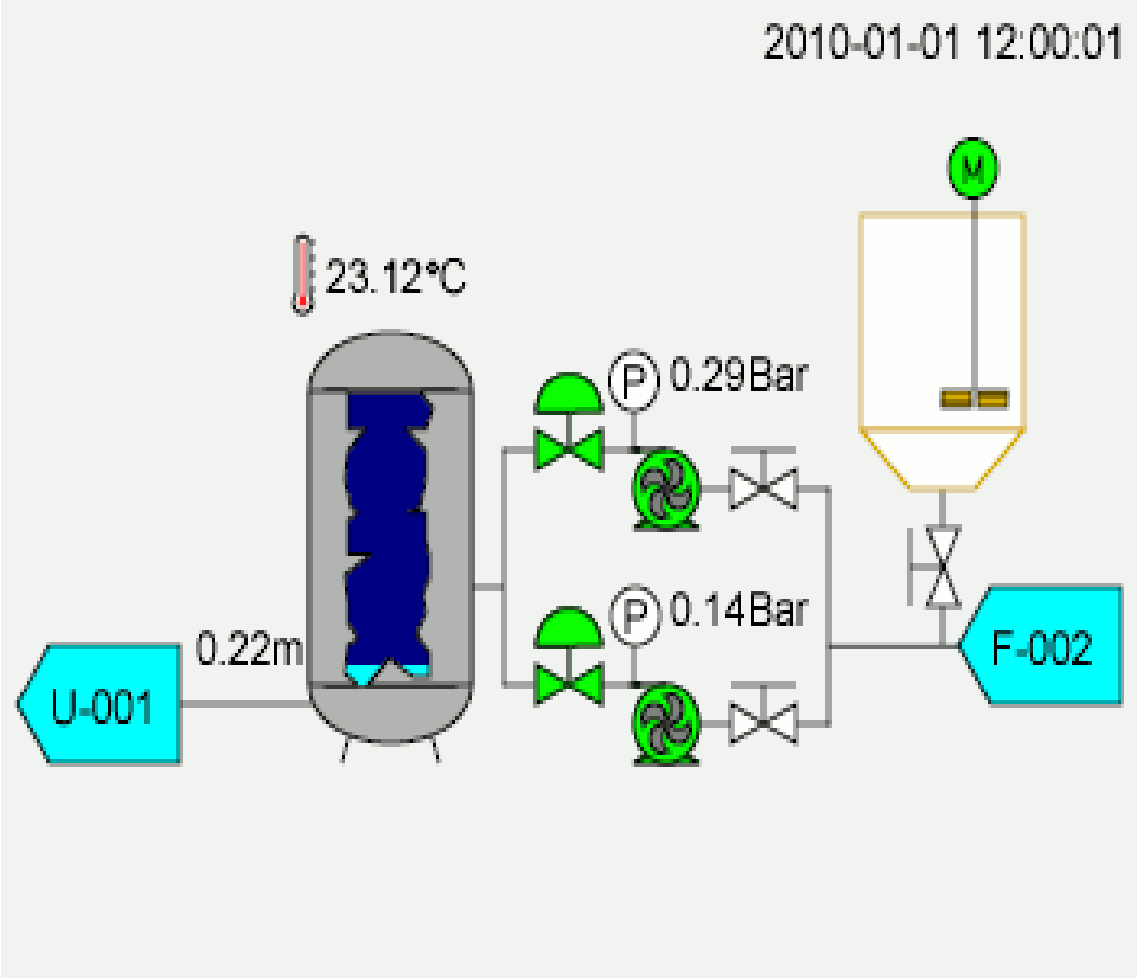
Source https://youtu.be/udRYxhS4-Ow
Source https://youtu.be/u2ucFo-cghQ

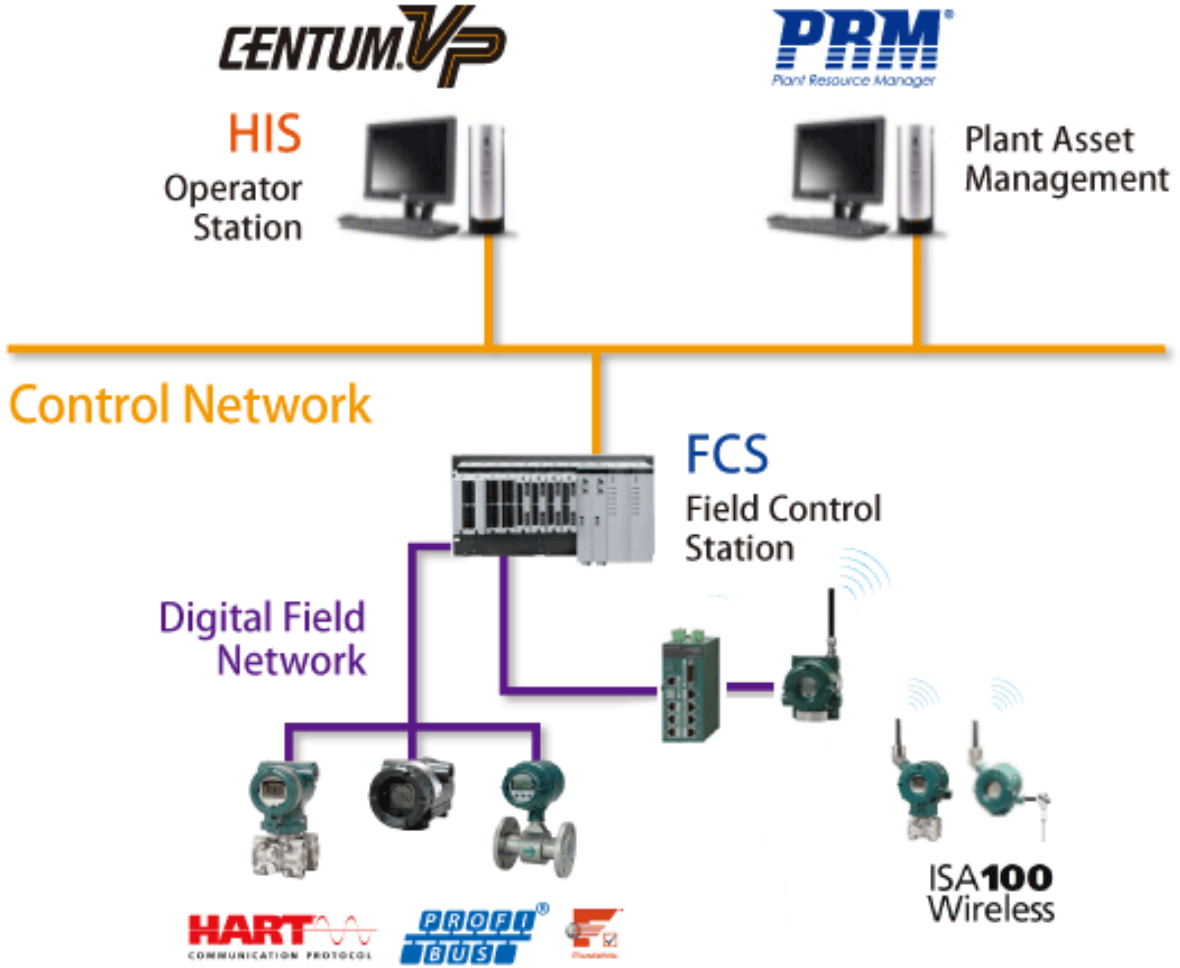
1.1 PROCESS AUTOMATION

- **Automate 'Hard' Processes – Process Industry**

1.1 PROCESS AUTOMATION

- **Automate 'Hard' Processes – Chemical Plant**





1.1 PROCESS AUTOMATION

Collaboration Domain Specific Information Models

The OPC Foundation closely cooperates with organizations and associations from various branches.
Specific information models of other standardization organizations are mapped onto OPC UA and thus become portable.

Source https://opcfoundation.org/

1.1 PROCESS AUTOMATION

Communication protocols/standards

- **Industrial machine to machine communication**
  - OPC United Architecture (**OPC UA**)
- **Agent communication language (ACL):**
  - Foundation for Intelligent Physical Agents (**FIPA**)
  - Knowledge Query and Manipulation Language (**KQML**)
- **Message-oriented middleware communication protocol**
  - Extensible Messaging and Presence Protocol (**XMPP**)
  - Apache Kafka stream-processing protocol (**Apache Kafka**)

1.1 PROCESS AUTOMATION

Software framework/implementation of communication protocols/standards

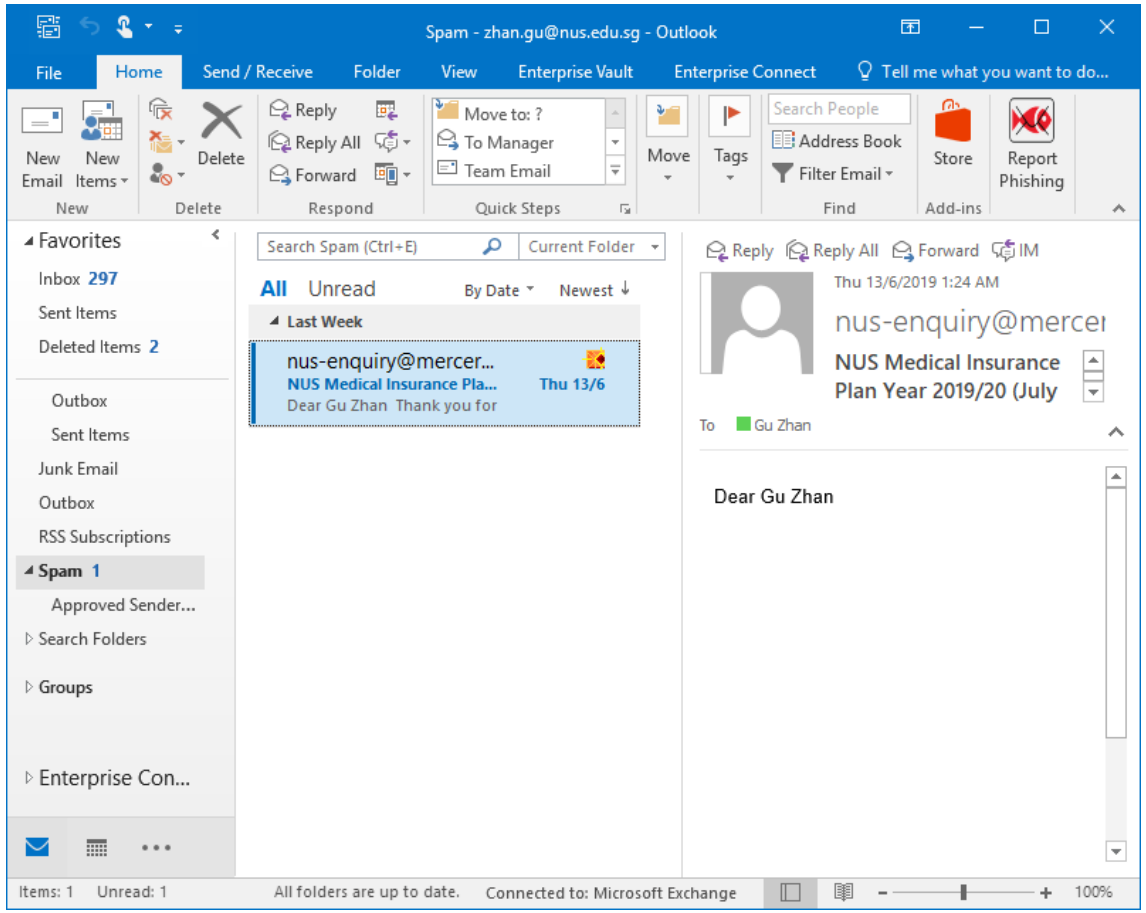
- **.Net Standard Stack (NSS** https://github.com/OPCFoundation/UA-.NETStandard) and Samples from the OPC Foundation (**OPC UA**)
- **Java Agent Development Framework (JADE** https://jade.tilab.com) for Foundation for Intelligent Physical Agents (**FIPA**) & (**ACL**)
- **Smart Python Agent Development Environment (SPADE** https://github.com/javipalanca/spade) for Extensible Messaging and Presence Protocol (**XMPP**)

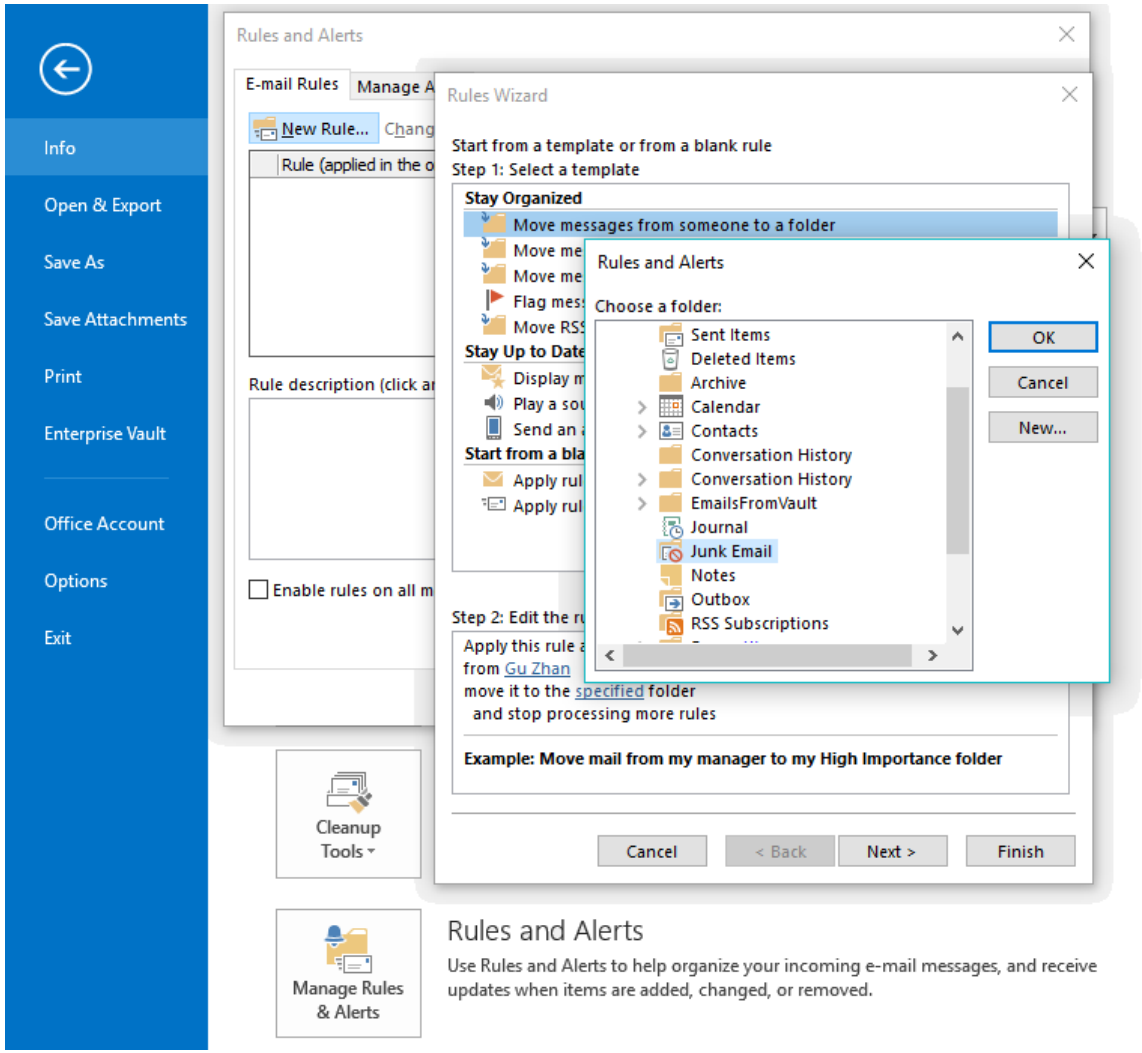
1.1 PROCESS AUTOMATION

- **Type of Processes**
  - 'Hard' Processes (e.g. manufacturing)
  - **'Soft' Processes (e.g. business operations)**

1.1 PROCESS AUTOMATION

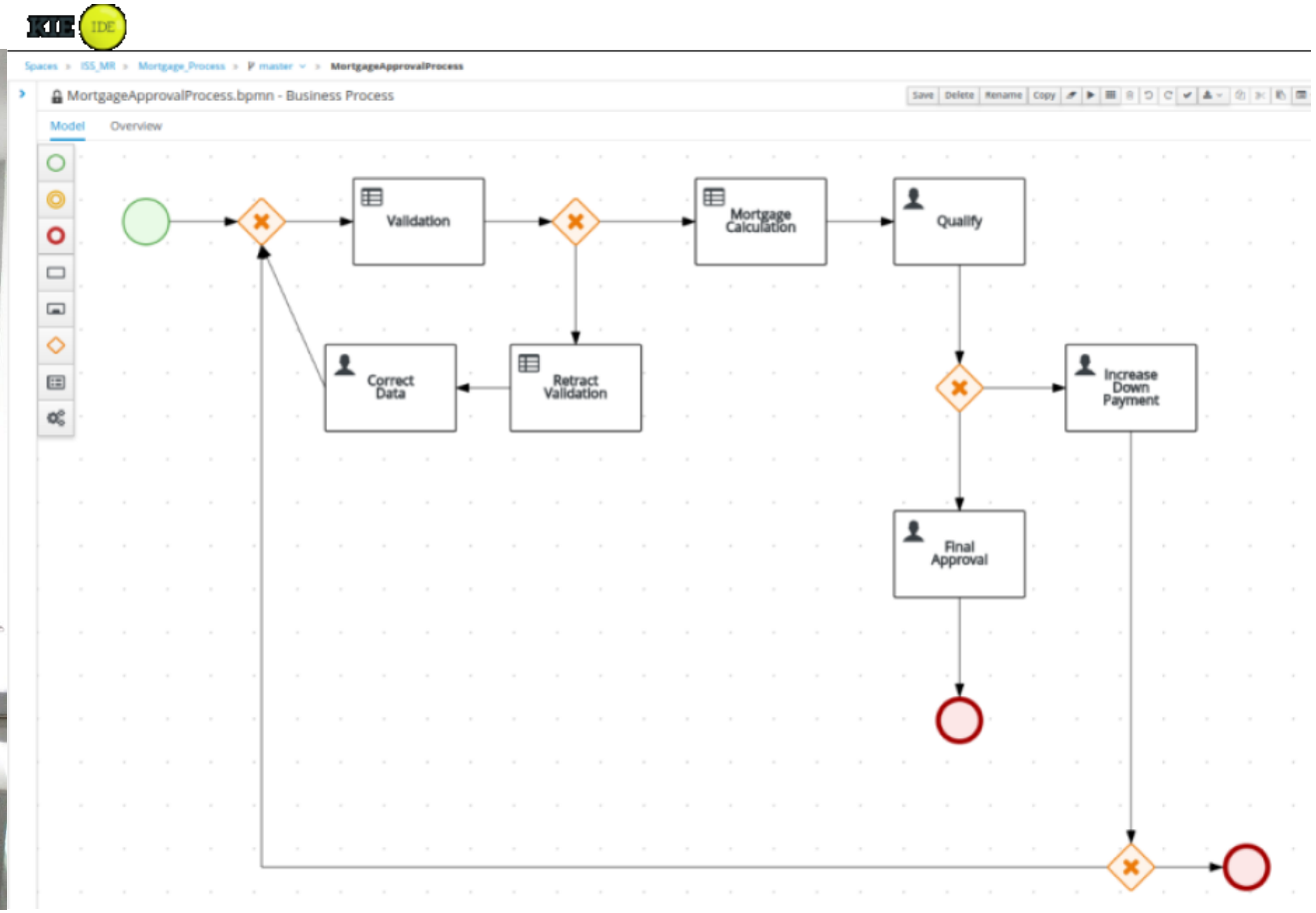
- **Automate 'Soft' Processes**





1.1 PROCESS AUTOMATION

- **Automate 'Soft' Processes**



1.1 PROCESS AUTOMATION

- **Automate 'Soft' Processes**
  - Car Insurance (Vehicle Damage Estimation)
    https://youtu.be/nHyqz1PY4hk
  - Mortgage loan application
    https://youtu.be/LXCgHxKgxfs
  - Payslip optical character recognition (OCR)
    https://youtu.be/SFPz_oLAa8M
  - Customer care: ISS Chatbot
    https://github.com/irs-cgs

1.2 PROCESS AUTOMATION USE CASES

Parcel Tracker

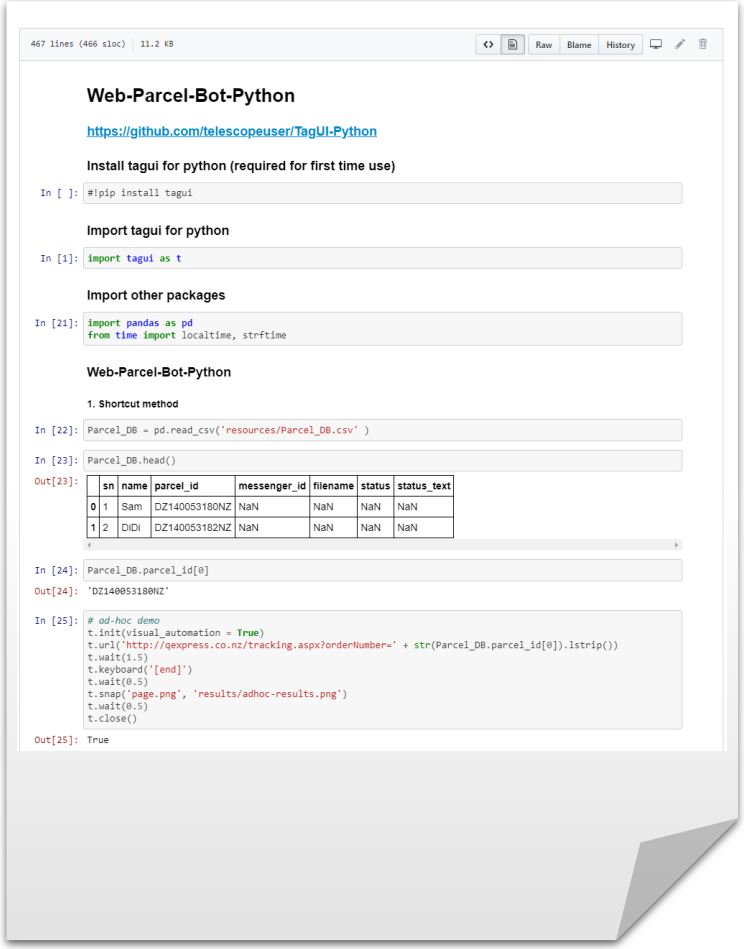
Source https://europost.eu/web/files/articles/22274/gallery/thumb_910x0_660410-4.jpg

1.2 PROCESS AUTOMATION USE CASES

- **Automated parcel status enquiry**

  [using TagUI Python]

  - Go to parcel tracking website;
  - Key in parcel identification number;
  - Capture parcel status result as screenshot;



467 lines (466 sloc) | 11.2 KB — Raw | Blame | History

Web-Parcel-Bot-Python

https://github.com/telescopeuser/TagUI-Python

Install tagui for python (required for first time use)

```
In [ ]: #!pip install tagui
```

Import tagui for python

```
In [1]: import tagui as t
```

Import other packages

```
In [21]: import pandas as pd
         from time import localtime, strftime
```

Web-Parcel-Bot-Python

1. Shortcut method

```
In [22]: Parcel_DB = pd.read_csv('resources/Parcel_DB.csv' )
```

```
In [23]: Parcel_DB.head()
```

Out[23]:

	sn	name	parcel_id	messenger_id	filename	status	status_text
0	1	Sam	DZ140053180NZ	NaN	NaN	NaN	NaN
1	2	DiDi	DZ140053182NZ	NaN	NaN	NaN	NaN

```
In [24]: Parcel_DB.parcel_id[0]
Out[24]: 'DZ140053180NZ'

In [25]: # ad-hoc demo
         t.init(visual_automation = True)
         t.url('http://qexpress.co.nz/tracking.aspx?orderNumber=' + str(Parcel_DB.parcel_id[0]).lstrip())
         t.wait(1.5)
         t.keyboard('[end]')
         t.wait(0.5)
         t.snap('page.png', 'results/adhoc-results.png')
         t.wait(0.5)
         t.close()
Out[25]: True
```

Source https://github.com/telescopeuser/S-IPA-Workshop/blob/master/workshop1/VisualAutomation/Web-Parcel-Bot-Python/Web-Parcel-Bot-Python.ipynb


File Edit View History Tools People Help
Fri 11:33 iss-user
快件追踪-新西兰易
Not secure qexpress.co.nz/tracking.aspx?orderNumber=DZ140053181NZ
GitHub Kaggle Scikit Learn Keras R RStudio KD Nuggets fast.ai Translate PDF Binder Google KIE WB
QC EXPRESS 易达通快递
信任交给我 放心回馈您
微信查单
设为首页 | 加入收藏
新西兰服务热线：
0064 9 838 8681 / 838 8690
首页 公司简介 产品服务 快件追踪 本月特价 公司通告 文档下载 联系我们
Click to enable Adobe Flash Player
返回首页
T单号查询 racking
Please enter your tracking number
请输入您要查询的单号
多个单号查询以逗号','分隔
搜索
M会员中心 ember Center
用户名
密 码
登 陆 注 册 忘记密码
奥克兰总部
(工作时间：新西兰时间9:30am-6:00pm)
QQ交谈 QQ交谈 QQ交谈 QQ交谈
中国上海分部
(工作时间：北京时间9:00am-6:00pm)
单号查询 TRACKING Please enter your tracking number 请输入您要查询的单号
多个单号查询以逗号','分隔
搜索
请注意: 国内快递取货日期为我司上传数据当日日期. 由于周末,公共假期及EMS网站数据更新等原因, 此日期与实际取货日期可能存在差异. 请广大客户以EMS网站记录日期为准! 特此声明! 谢谢!
查询结果
运单号：DZ140053181NZ
出发地：Auckland, New Zealand
目的地：中国
件数：1
关于身份证上传说明：
如果收件人之前已经上传过身份证正反面复印件，则无需重复上传
时间 内容
2019-06-26 19:06 【新西兰-奥克兰】订单已扫描，进入操作中心等待处理 Order received, waiting for processing
2019-06-27 12:07 【新西兰-奥克兰】订单正在进行分拣, 请尽快上传收件人身份证 Order is processing, please upload your ID for custom clearance
【新西兰-奥克兰】已递交目的地海关申报

File Edit View History Tools People Help

Fri 11:14 iss-user

快件追踪-新西兰易

Not secure | qexpress.co.nz/tracking.aspx?orderNumber=DZ140053181NZ

GitHub Kaggle Scikit Learn Keras R RStudio KD Nuggets fast.ai Translate PDF Binder Google KIE WB

Would you like to translate this page? Options

Translate Nope

密 码

登 陆 注 册 忘记密码

奥克兰总部

(工作时间：新西兰时间9:30am-6:00pm)

QQ交谈 QQ交谈 QQ交谈 QQ交谈

中国上海分部

(工作时间：北京时间9:00am-6:00pm)

QQ交谈 QQ交谈 QQ交谈

目的地：中国

件数：1

关于身份证上传说明：

如果收件人之前已经上传过身份证正反面复印件，则无需重复上传

时间	内容
2019-06-26 19:06	【新西兰-奥克兰】订单已扫描，进入操作中心等待处理 Order received, waiting for processing
2019-06-27 12:07	【新西兰-奥克兰】订单正在进行分拣, 请尽快上传收件人身份证 Order is processing, please upload your ID for custom clearance
2019-06-28 12:08	【新西兰-奥克兰】已递交目的地海关申报 Manifest loaded to local custom
2019-06-29 13:32	【包裹抵达-中国】目的地清关查验中，等待放行 Waiting for custom release
2019-07-19 15:30	货物清关成功！现已转发德邦快递，查询单号：8419493225

德邦跟踪单号：[8419493225]

时间	内容
2019-07-19 14:15	您的订单已被收件员揽收,【上海嘉定区嘉行公路营业部】库存中
2019-07-19 16:58	运输中，离开【上海嘉定区嘉行公路营业部】，下一站【上海转运中心（DP）】
2019-07-19 17:27	货物已到达上海转运中心（DP）
2019-07-20 02:51	运输中，离开【上海转运中心（DP）】，下一站【东莞转运场】
2019-07-21 00:59	货物已到达东莞转运场
2019-07-21 08:23	运输中，离开【东莞转运场】，下一站【东莞寮步镇快递分部】
2019-07-21 08:23	运输中，离开【东莞转运场】，下一站【东莞寮步镇快递分部】
2019-07-21 08:30	货物已到达东莞寮步镇快递分部
2019-07-21 08:59	预派送，派件员：孟康飞，电话：
2019-07-21 16:29	预派送，派件员：骆国亮，电话：13726417538
2019-07-21 16:29	正在派送中……请稍候
2019-07-21 16:34	提前通知。快递员：604085+骆国亮，已提前通知收货人
2019-07-21 16:35	提前通知。快递员：604085+骆国亮，已提前通知收货人
2019-07-21 16:35	提前通知。快递员：604085+骆国亮，已提前通知收货人
2019-07-21 16:36	2地址无法找到且电话无法联系/错误
2019-07-21 16:51	提前通知。快递员：604085+骆国亮，已提前通知收货人
2019-07-21 17:01	派送中，派件员：骆国亮，电话：13726417538
2019-07-21 17:01	已签收，签收人类型：代收点签收

Intelligent bot can work under foreign languages.

Password

登 陆 注 册 forget password

Auckland Headquarters

(Working hours: New Zealand time 9:30am-6:00pm)

QQ交谈 QQ交谈 QQ交谈 QQ交谈

Shanghai Branch of China

(Working hours: 9:00am-6:00pm Beijing time)

QQ交谈 QQ交谈 QQ交谈

: Auckland, New Zealand

Destination: China

Number of pieces: 1

About ID card upload instructions:

*** If the recipient has previously uploaded a copy of the front and back of the ID card, there is no need to upload it repeatedly ***

time	content
2019-06-26 19:06	[New Zealand-Auckland] The order has been scanned and entered the operation center for processing Order received, waiting for processing
2019-06-27 12:07	[New Zealand-Auckland] Orders are being sorted, please upload the ID card as soon as possible , please upload your ID for custom clearance
2019-06-28 12:08	[New Zealand-Auckland] has submitted the destination customs declaration Manifest loaded to local custom
2019-06-29 13:32	[Parcel Arrival - China] In the destination customs clearance inspection, waiting for release Waiting for custom release
2019-07-19 15:30	The goods are cleared successfully! Now forwarded to Debon Express, inquiry number: 8414993225

Debon tracking number: [8419493225]

time	content
2019-07-19 14:15	Your order has been collected by the recipient, [Shanghai Jiading District Jiaxing Road Sales Department] in stock
2019-07-19 16:58	During transportation, leave [Shanghai Jiading District Jiaxing Highway Sales Department], next stop [Shanghai Transit Center (DP)]
2019-07-19 17:27	The goods have arrived at the Shanghai Transit Center (DP)
2019-07-20 02:51	During transportation, leave [Shanghai Transit Center (DP)], next stop [Dongguan Transfer Station]
2019-07-21 00:59	The goods have arrived at the Dongguan transfer yard
2019-07-21 08:23	During transportation, leave [Dongguan Transfer Field], next stop [Dongguan Liaobu Town Express Branch]
2019-07-21 08:23	During transportation, leave [Dongguan Transfer Field], next stop [Dongguan Liaobu Town Express Branch]
2019-07-21 08:30	The goods have arrived in Dongguan Liaobu Town Express Branch
2019-07-21 08:59	Pre-delivery, dispatcher: Meng Kangfei, phone:
2019-07-21 16:29	Pre-delivery, dispatcher: Luo Guoliang, Tel: 13726417538
2019-07-21 16:29	Being dispatched... please wait
2019-07-21 16:34	notify in advance. Courier: 604085+ Luo Guoliang, the consignee has been notified in advance
2019-07-21 16:35	notify in advance. Courier: 604085+ Luo Guoliang, the consignee has been notified in advance
2019-07-21 16:35	notify in advance. Courier: 604085+ Luo Guoliang, the consignee has been notified in advance
2019-07-21 16:36	2 address could not be found and the phone could not be contacted / error
2019-07-21 16:51	notify in advance. Courier: 604085+ Luo Guoliang, the consignee has been notified in advance
2019-07-21 17:01	In the delivery, the dispatcher: Luo Guoliang, Tel: 13726417538
2019-07-21 17:01	Signed, signer type: collection point sign

photo album name

Multiple Download

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Portfolio
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Resources
Statement of Account

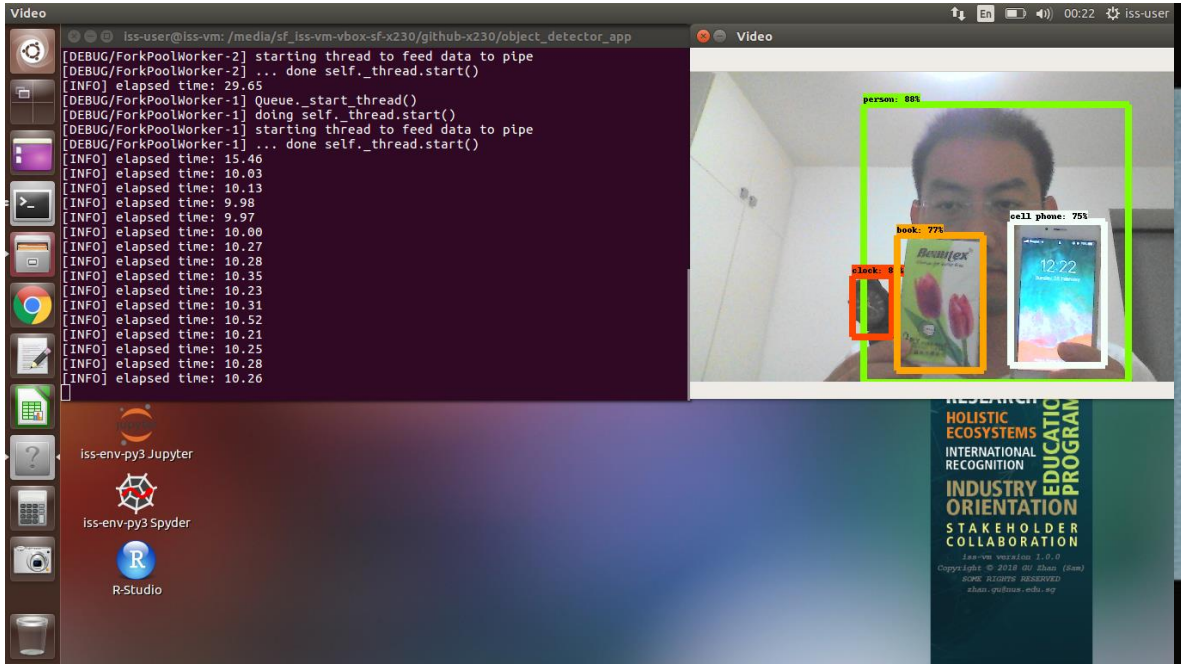
https://github.com/telescopeuser/S-IPA-Workshop/blob/master/workshop1/LocalAI/IPA_Text_Summarization/TextSummarization-py2.ipynb

Source https://www.redmineup.com/pages/blog/steps-how-to-reduce-email-overload

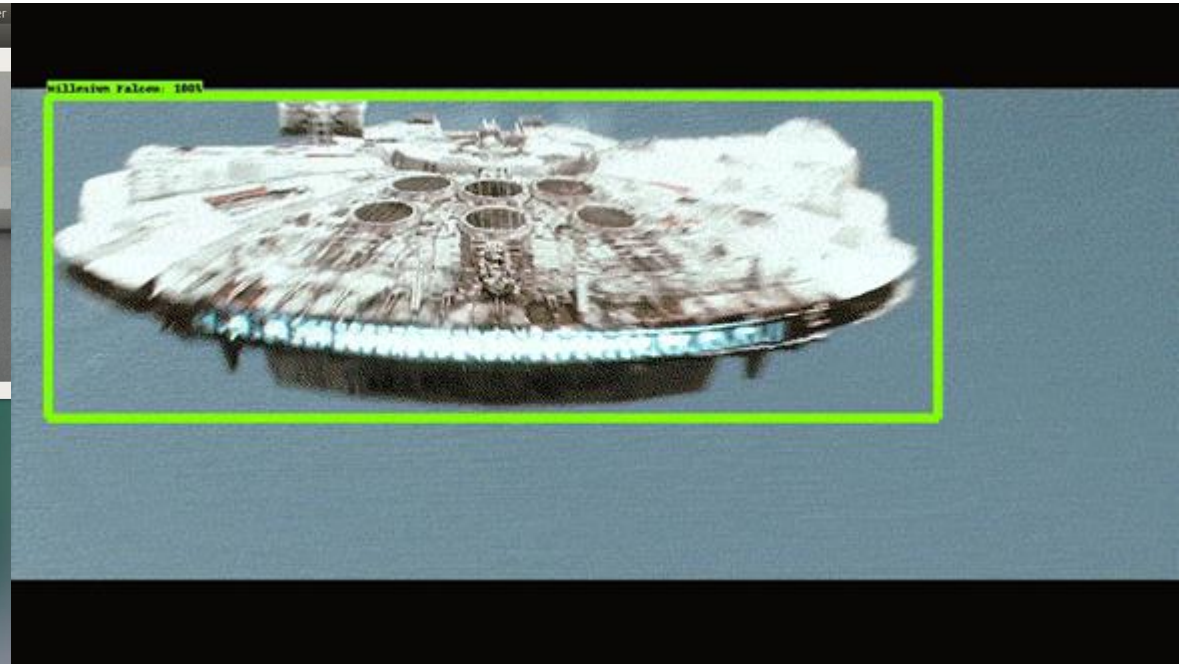
1.3 PROCESS AUTOMATION USING LOCAL AI

1.3 PROCESS AUTOMATION USING LOCAL AI

Object Detection



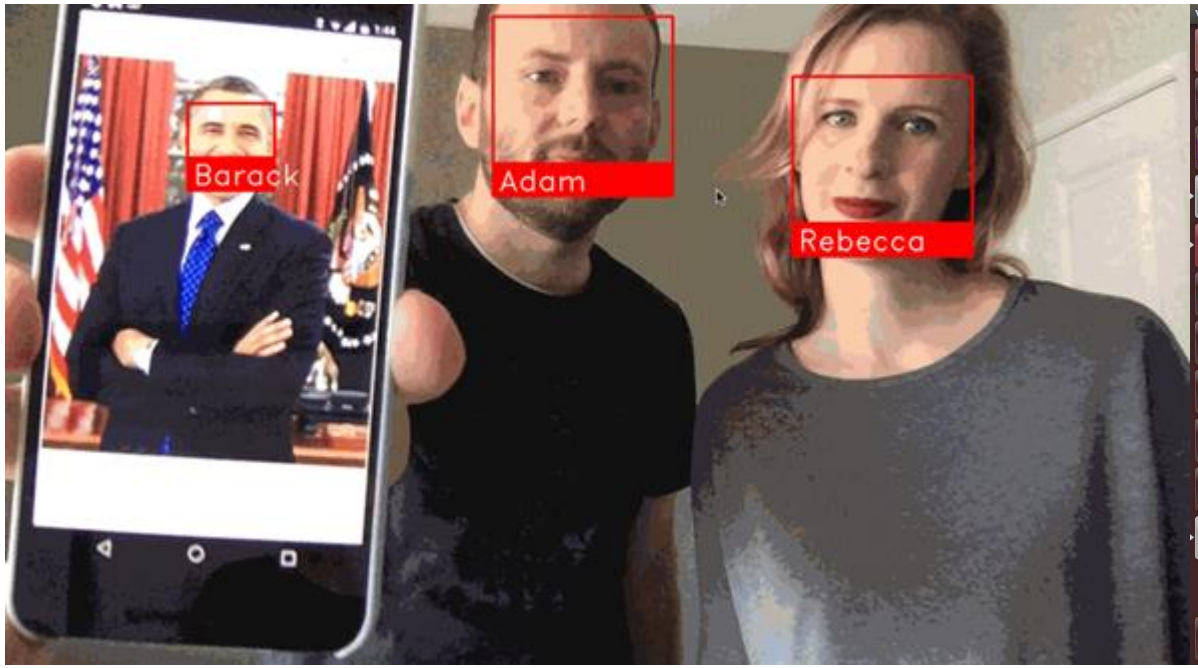
Source https://github.com/telescopeuser/object_detector_app



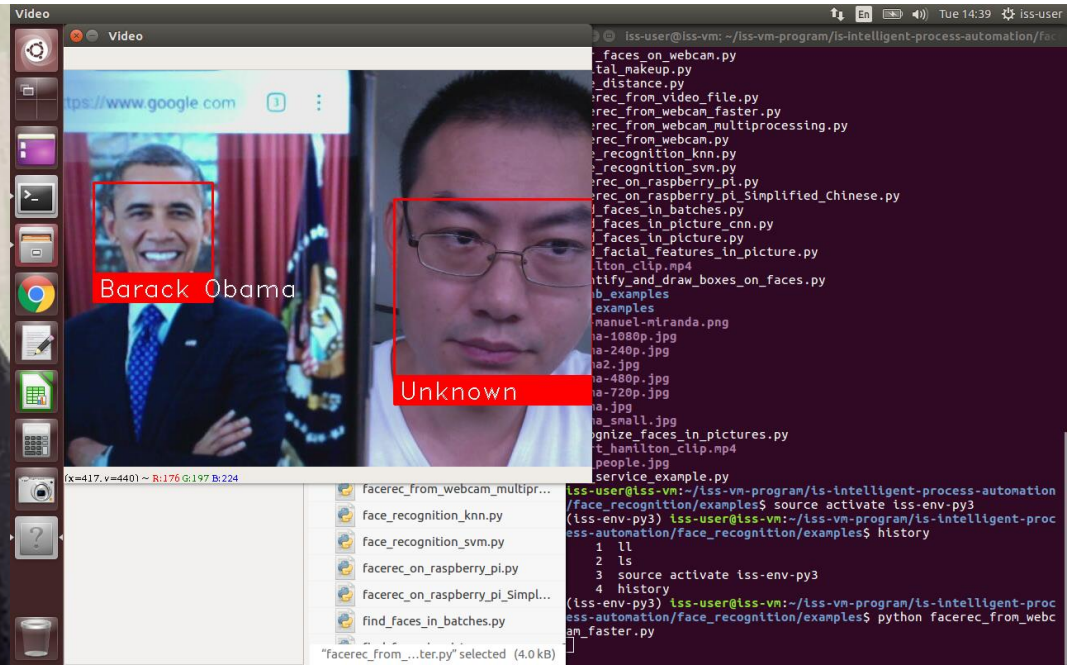
Source https://github.com/bourdakos1/Custom-Object-Detection

1.3 PROCESS AUTOMATION USING LOCAL AI

Face Detection



Source https://github.com/ageitgey/face_recognition

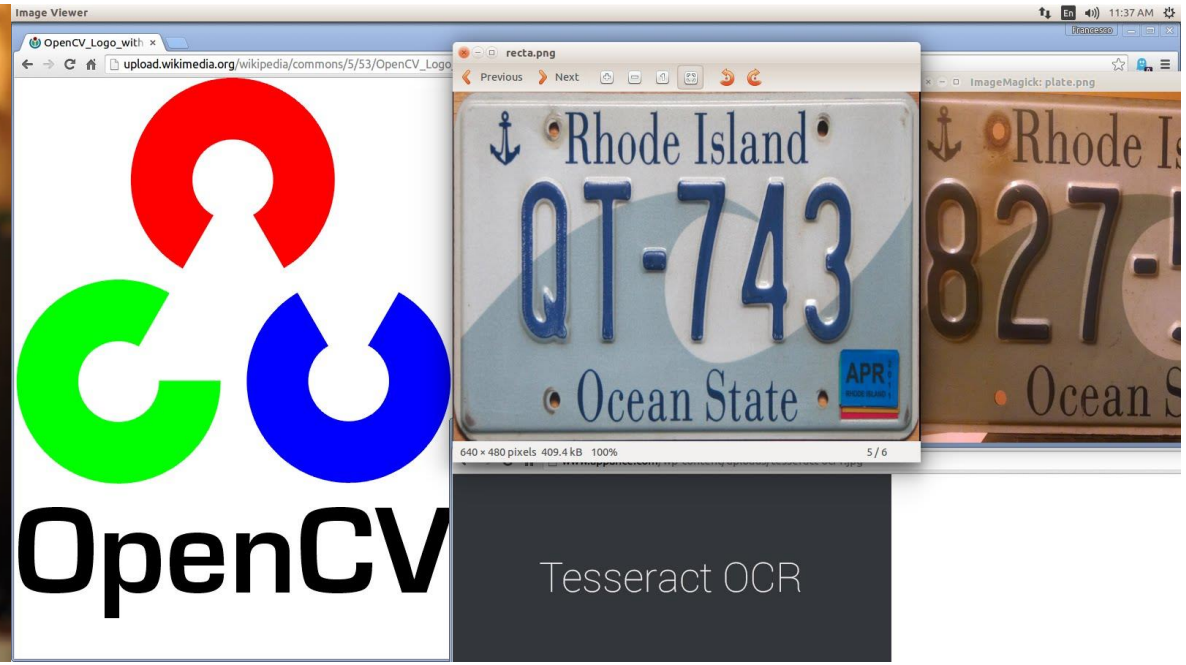


Source https://github.com/telescopeuser/S-IPA-Workshop/tree/master/workshop1/LocalAI/IPA_a_facedetect

1.3 PROCESS AUTOMATION USING LOCAL AI

Optical Character Recognition

Source https://youtu.be/JhM01tE6QIY



Source https://github.com/tesseract-ocr/tesseract

1.3 PROCESS AUTOMATION USING LOCAL AI

Language Processing

Source https://spacy.io/

1.4 PROCESS AUTOMATION USING LOCAL AI WORKSHOP

Individual Workshop

- Refer to text summarization/teaser technology:
  - https://github.com/xiaoxu193/PyTeaser
  - https://github.com/telescopeuser/S-IPA-Workshop/blob/master/workshop1/LocalAI/IPA_Text_Summarization/TextSummarization-py2.ipynb
- Apply the text summarization technology to summarize textual data, e.g. emails, customer feedbacks, news articles, competitor web pages.

MORE WORKSHOP / HOMEWORK

- **Explore Intelligent Systems created by past learners**

  https://github.com/ISA-IPA

End of Lecture Notes

Contact eGL

Singapore e-Government Leadership Centre
National University of Singapore
29 Heng Mui Keng Terrace
Block D & E
Singapore 119620

Tel	:	**(65) 6516 1156**
Fax	:	**(65) 6778 2571**
URL	:	**www.egl.sg**
Email	:	**egl-enquiries@nus.edu.sg**

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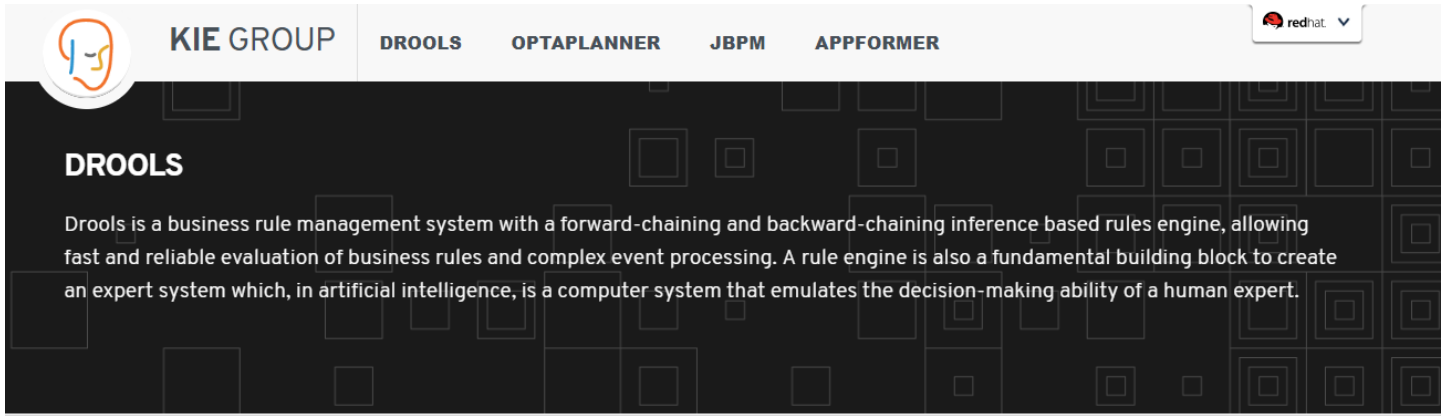
Appendices

[SUPPLEMENTARY]
OPEN SOURCE ENTERPRISE GRADE RULE/PROCESS AUTOMATION PLATFORM

RULE/PROCESS AUTOMATION SYSTEM

KIE BPMS/BRMS Suite – Workshop Tools



DROOLS

Drools is a business rule management system with a forward-chaining and backward-chaining inference based rules engine, allowing fast and reliable evaluation of business rules and complex event processing.

Read more →

OPTAPLANNER

OptaPlanner is a constraint solver that optimizes use cases such as employee rostering, vehicle routing, task assignment and cloud optimization.

Read more →

JBPM

jBPM is a flexible Business Process Management suite allowing you to model your business goals by describing the steps that need to be executed to achieve those goals.

Read more →

APPFORMER

AppFormer is a low code platform to develop modern applications. It's a powerful tool for developers that can easily build applications by mashing up components and connect them to other Red Hat modules and software.

We make building apps looks easy.

Read more →

JBoss KIE

http://www.kiegroup.org/

JBoss KIE DROOLS

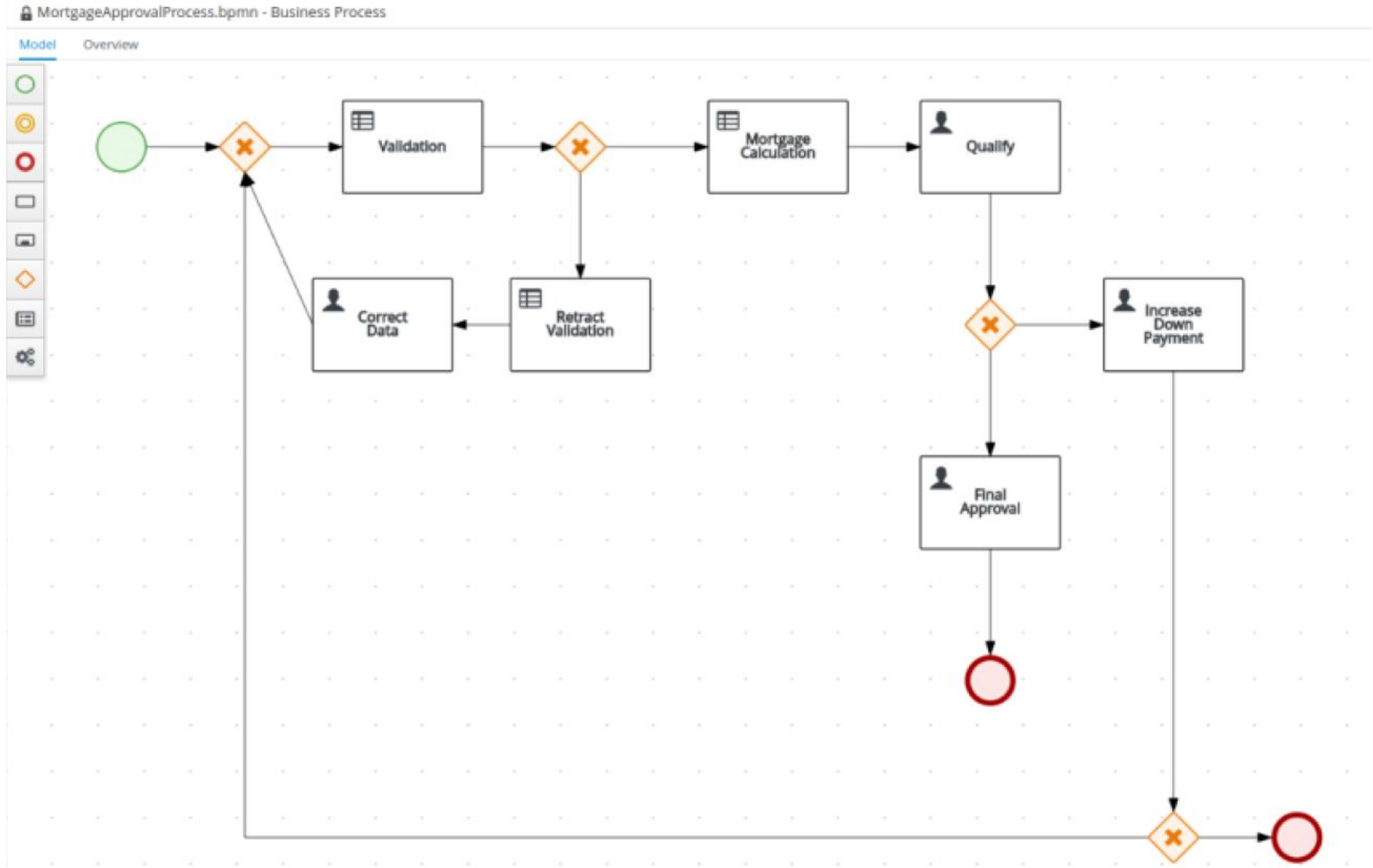
http://www.drools.org/

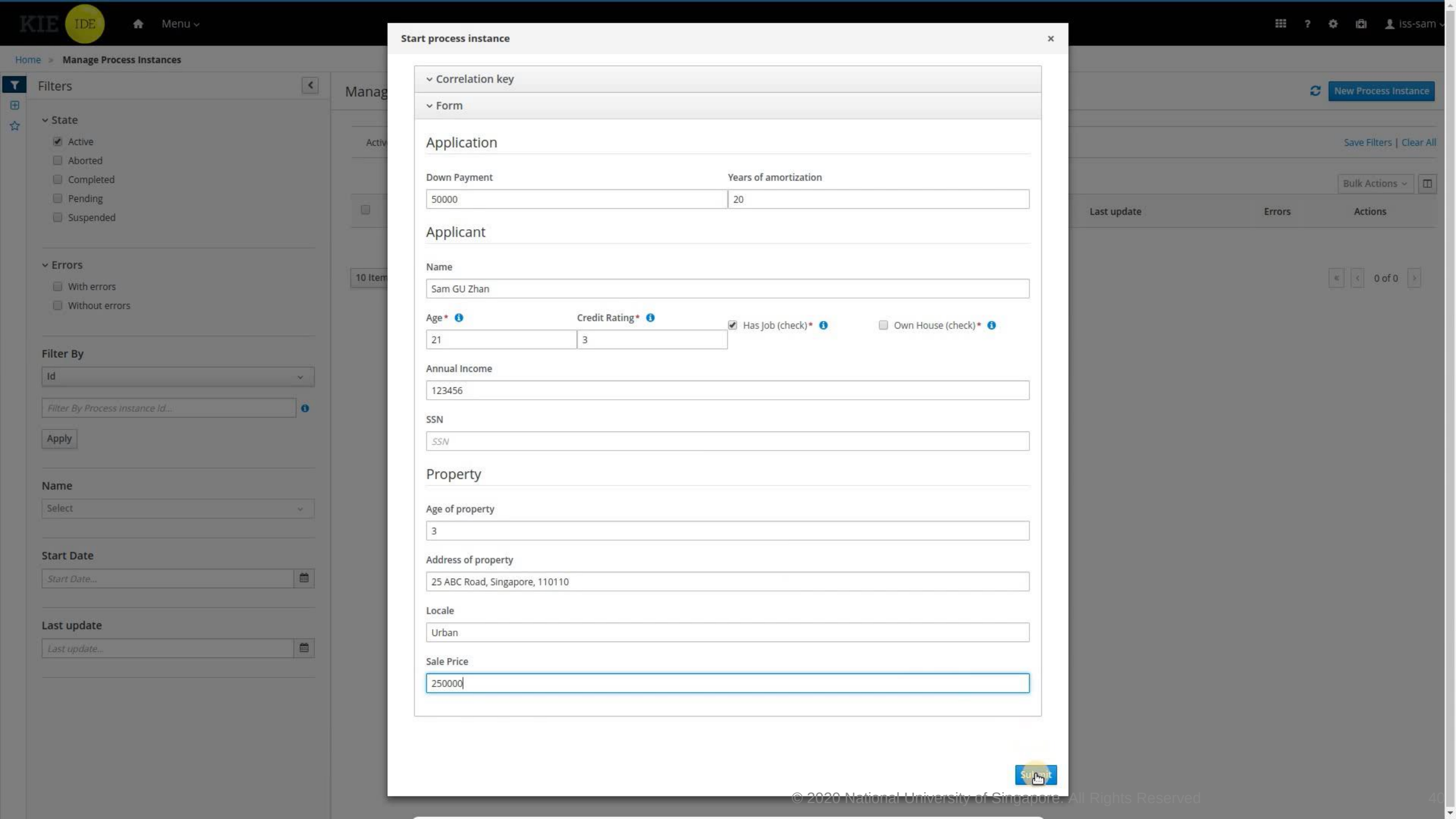
JBoss KIE JBPM

http://www.jbpm.org/

RULE/PROCESS AUTOMATION SYSTEM

KIE BPMS/BRMS Suite – Mortgage application systems





KNOWLEDGE REPRESENTATION

Rules – KIE Drools

a driving license application.

```
public class Applicant {
    private String name;
    private int age;
    private boolean valid;
    // getter and setter methods here
}
```

Now that we have our data model we can write our first rule. We assume that the application uses rules to reject invalid applications. As this is a simple validation use case we will add a single rule to disqualify any applicant younger than 18.

```
package com.company.license

rule "Is of valid age"
when
    $a : Applicant( age < 18 )
then
    $a.setValid( false );
end
```

To make the Drools engine aware of data, so it can be processed against the rules, we have to ***insert*** the data, much like with a database. When the Applicant instance is inserted into the Drools engine it is evaluated against the constraints of the rules, in this case just two constraints for one rule. We say ***two*** because the type **Applicant** is the first object type constraint, and **age < 18** is the second field constraint. **An object type constraint plus its zero or more field constraints is referred to as a pattern**. When an inserted instance satisfies both the object type constraint and all the field constraints, it is said to be matched. The **$a** is a binding variable which permits us to reference the matched object in the consequence. There its properties can be updated. The dollar character ('$') is optional, but it helps to differentiate variable names from field names. The process of matching patterns against the inserted data is, not surprisingly, often referred to as ***pattern matching***.

Source https://docs.jboss.org/drools/release/latest/drools-docs/html_single/index.html#_methods_versus_rules

4.1.3. Methods versus Rules

People often confuse methods and rules, and new rule users often ask, "How do I call a rule?" After the last section, you are now feeling like a rule expert and the answer to that is obvious, but let's summarize the differences nonetheless.

```
public void helloWorld(Person person) {
    if ( person.getName().equals( "Chuck" ) ) {
        System.out.println( "Hello Chuck" );
    }
}
```

- Methods are called directly.
- Specific instances are passed.
- One call results in a single execution.

```
rule "Hello World" when
    Person( name == "Chuck" )
then
    System.out.println( "Hello Chuck" );
end
```

- Rules execute by matching against any data as long it is inserted into the Drools engine.
- Rules can never be called directly.
- Specific instances cannot be passed to a rule.
- Depending on the matches, a rule may fire once or several times, or not at all.

Source https://docs.jboss.org/drools/release/latest/drools-docs/html_single/index.html#_methods_versus_rules

4.1.4. Cross Products

Earlier the term "cross product" was mentioned, which is the result of a join. Imagine for a moment that the data from the fire alarm example were used in combination with the following rule where there are no field constraints:

```
rule "Show Sprinklers" when
    $room : Room()
    $sprinkler : Sprinkler()
then
    System.out.println( "room:" + $room.getName() +
                        " sprinkler:" + $sprinkler.getRoom().getName() );
end
```

In SQL terms this would be like doing `select * from Room, Sprinkler` and every row in the Room table would be joined with every row in the Sprinkler table resulting in the following

```
room:office sprinkler:office
room:office sprinkler:kitchen
room:office sprinkler:livingroom
room:office sprinkler:bedroom
room:kitchen sprinkler:office
room:kitchen sprinkler:kitchen
room:kitchen sprinkler:livingroom
room:kitchen sprinkler:bedroom
room:livingroom sprinkler:office
room:livingroom sprinkler:kitchen
room:livingroom sprinkler:livingroom
room:livingroom sprinkler:bedroom
room:bedroom sprinkler:office
room:bedroom sprinkler:kitchen
room:bedroom sprinkler:livingroom
room:bedroom sprinkler:bedroom
```

Source https://docs.jboss.org/drools/release/latest/drools-docs/html_single/index.html#_cross_products

These cross products can obviously become huge, and they may very well contain spurious data. The size of cross products is often the source of performance problems for new rule authors. From this it can be seen that it's always desirable to constrain the cross products, which is done with the variable constraint.

```
rule
when
    $room : Room()
    $sprinkler : Sprinkler( room == $room )
then
    System.out.println( "room:" + $room.getName() +
                        " sprinkler:" + $sprinkler.getRoom().getName() );
end
```

This results in just four rows of data, with the correct Sprinkler for each Room. In SQL (actually HQL) the corresponding query would be `select * from Room, Sprinkler where Room == Sprinkler.room`.

```
room:office sprinkler:office
room:kitchen sprinkler:kitchen
room:livingroom sprinkler:livingroom
room:bedroom sprinkler:bedroom
```

KNOWLEDGE REPRESENTATION

Rules – KIE Drools

- KIE Drools rule is declarative language. It's functional similar to structured query language SQL.
- In logical reasoning context, When/Then rules (in knowledge base) are considered universally true, thus can be 'declared'.

CashFlow Rule

```
select * from  Account acc,
     Cashflow cf, AccountPeriod ap
where acc.accountNo ==  cf.accountNo and
      cf.type == CREDIT
      cf.date >= ap.start and
      cf.date <= ap.end
acc.balance += cf.amount
```

```
rule "increase balance for AccountPeriod Credits"
    when
        ap  : AccountPeriod()
        acc : Account()
        cf  : CashFlow( type == CREDIT,
                        accountNo == acc.accountNo,
                        date >= ap.start && <= ap.end )
    then
        acc.balance  += cf.amount;
end
```

Two rules can be used to determine the debit and credit for that quarter and update the Account balance. The two rules below constrain the cashflows for an account for a given time period. Notice the "&&" which use short cut syntax to avoid repeating the field name twice.

```
rule "increase balance for credits"
when
  ap : AccountPeriod()
  acc : Account( $accountNo : accountNo )
  CashFlow( type == CREDIT,
            accountNo == $accountNo,
            date >= ap.start && <= ap.end,
            $amount : amount )
then
  acc.balance  += $amount;
end
```

```
rule "decrease balance for debits"
when
  ap : AccountPeriod()
  acc : Account( $accountNo : accountNo )
  CashFlow( type == DEBIT,
            accountNo == $accountNo,
            date >= ap.start && <= ap.end,
            $amount : amount )
then
  acc.balance -= $amount;
end
```

Earlier we showed how rules would equate to SQL, which can often help people with an SQL background to understand rules. The two rules above can be represented with two views and a trigger for each view, as below:

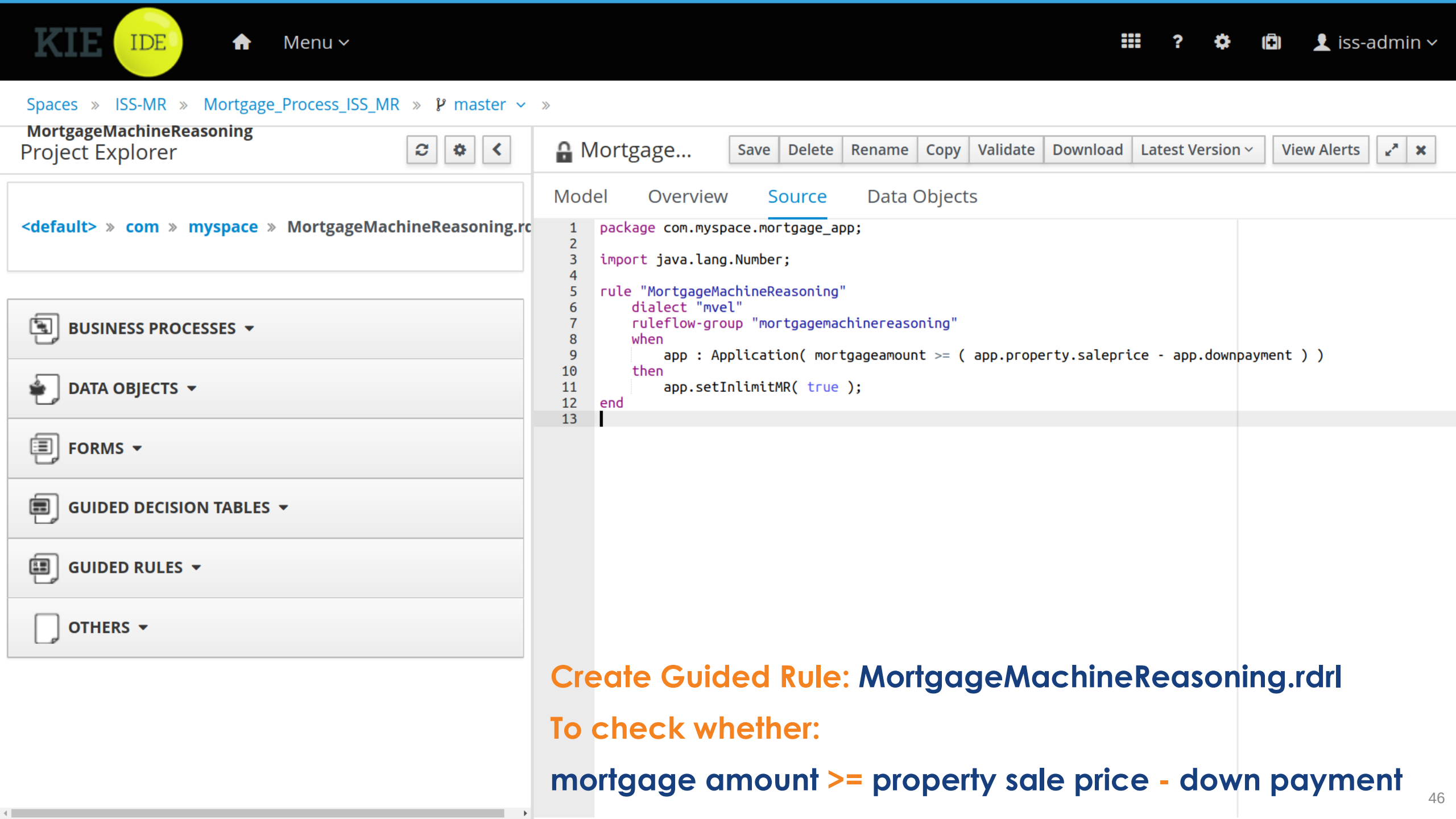
```
select * from Account acc,
              Cashflow cf,
              AccountPeriod ap
where acc.accountNo == cf.accountNo and
      cf.type == CREDIT and
      cf.date >= ap.start and
      cf.date <= ap.end
```

```
select * from Account acc,
              Cashflow cf,
              AccountPeriod ap
where acc.accountNo == cf.accountNo and
      cf.type == DEBIT and
      cf.date >= ap.start and
      cf.date <= ap.end
```

```
trigger : acc.balance += cf.amount
```

```
trigger : acc.balance -= cf.amount
```

Source https://docs.jboss.org/drools/release/latest/drools-docs/html_single/index.html#_cashflow_example



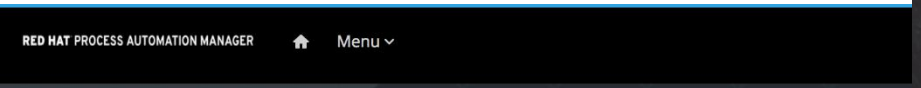
Create Guided Rule: MortgageMachineReasoning.rdrl

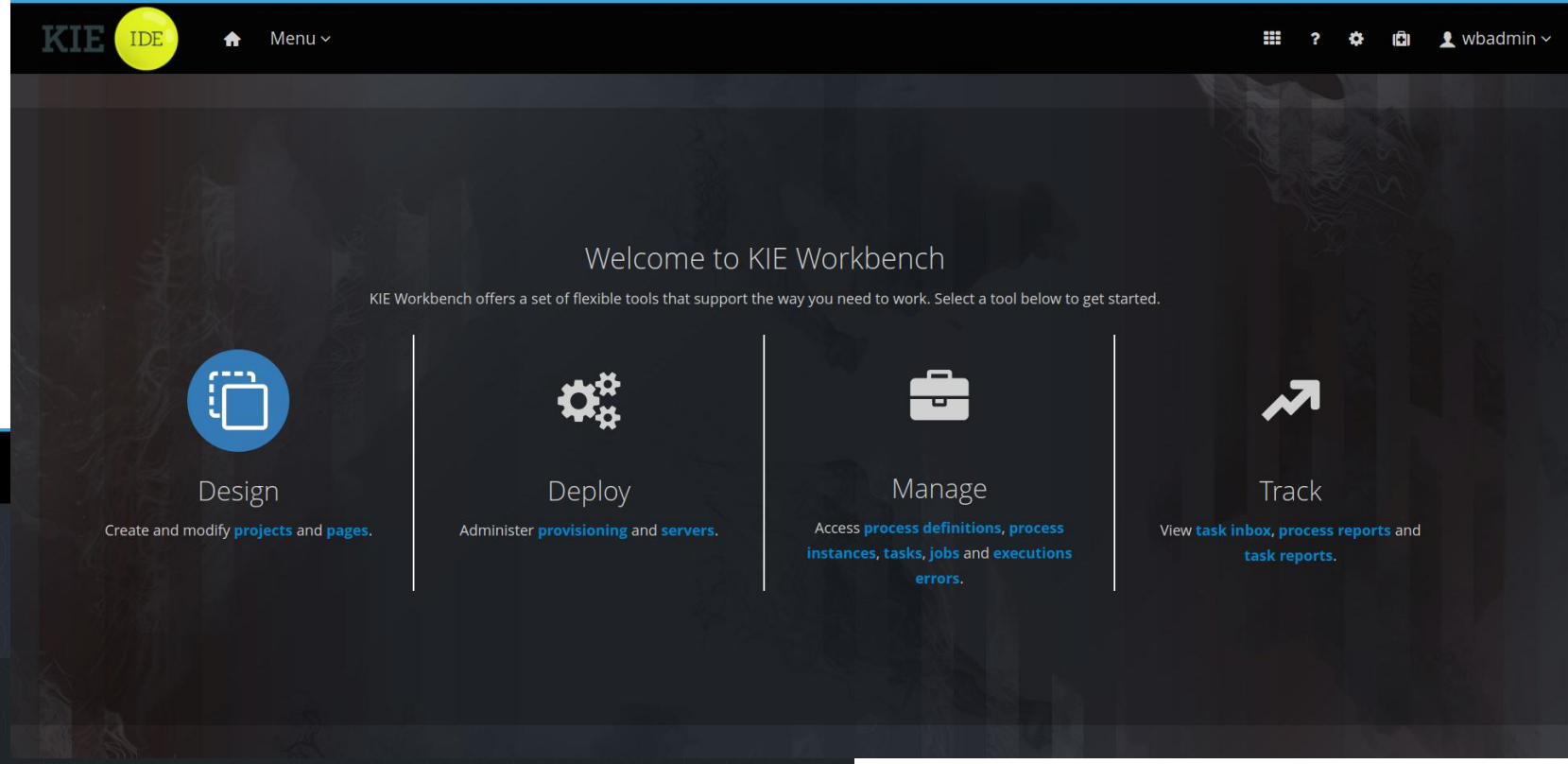
To check whether:

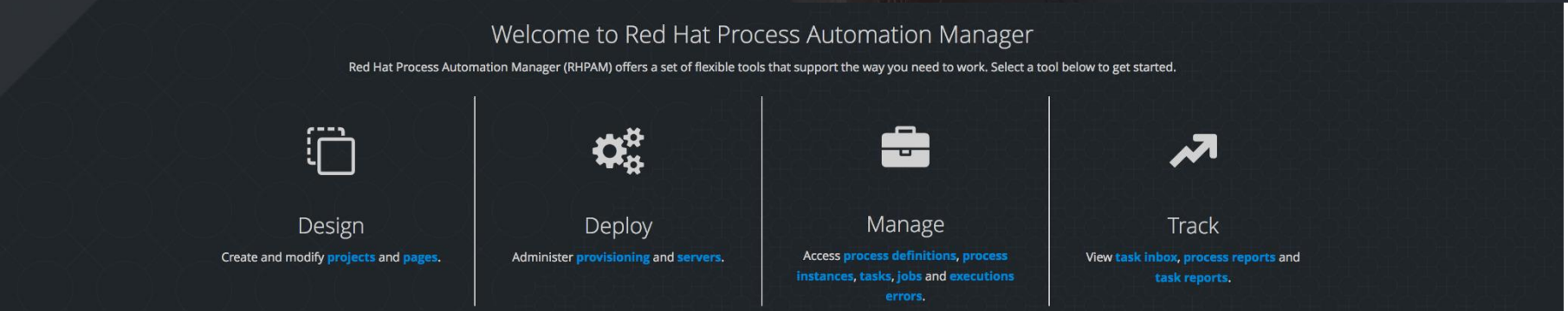
mortgage amount >= property sale price - down payment

PROCESS AUTOMATION MANAGER (PAM / JBPM) & DECISION MANAGER (DM / DROOLS)

Key Customer Case Studies


RED HAT PROCESS AUTOMATION MANAGER
Menu


KIE
IDE
Menu
wbadmin
Welcome to KIE Workbench
KIE Workbench offers a set of flexible tools that support the way you need to work. Select a tool below to get started.
Design
Create and modify projects and pages.
Deploy
Administer provisioning and servers.
Manage
Access process definitions, process instances, tasks, jobs and executions errors.
Track
View task inbox, process reports and task reports.


Welcome to Red Hat Process Automation Manager
Red Hat Process Automation Manager (RHPAM) offers a set of flexible tools that support the way you need to work. Select a tool below to get started.
Design
Create and modify projects and pages.
Deploy
Administer provisioning and servers.
Manage
Access process definitions, process instances, tasks, jobs and executions errors.
Track
View task inbox, process reports and task reports.

Aviva Achieves Faster Response Times - Courtesy: Red Hat PAM

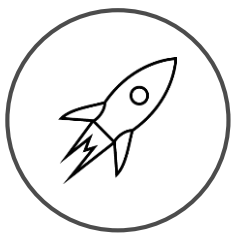
Aviva leveraged Fuse to manage additional service endpoints and establish a service gateway for routing and service integration with third-party vendor systems, such as Kofax and IBM FileNet.

CHALLENGE

The inflexible bond management and workflow systems of Aviva's new acquisition FPI, was hampering it's goal of bringing the new joint offering to the Asian market faster.

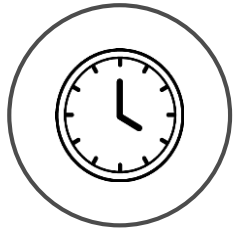
SOLUTION

- Aviva decided to migrate from FPI's existing AWD system to a new & faster imaging and workflow application based on **Red Hat Process Automation Manager (PAM)**.
- Standardized on a single process automation platform leveraging **PAM** to unify applications across users in Singapore, Hong Kong and Dubai, in 6 months.



New Services at a Faster Rate

Lower Overall Costs



Faster Response Times

Case Study

Jalisco State Government, Powered by Red Hat Middleware, Increases Service Rate by 900%

“With the Red Hat Solution, we can gradually scale up and grow in line with demand for our services.This capability is quite extraordinary, because we can add other solutions that permit further improvement of our servicesand building innovative applications ”

- MASTER MARIA ANGELINA ALARCON ROMERO
DIRECTOR,TECHNOLOGY INNOVATION,
GOVERNMENT OF THE STATE OF JALISCO

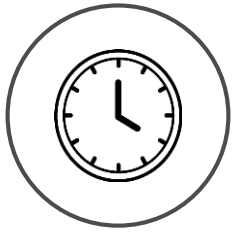
Case Study

CHALLENGE

With dispersed data sources and manual processes, Jalisco State was finding it challenging to cope with the increasing demands of its citizens

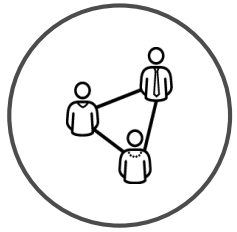
SOLUTION

With Red Hat Fuse connecting disparate systems and **BPM Suite** automating the complex processes, Jalisco State provided a wide range of services from mobility, public safety, and revenue collection to environmental issues. Citizens could pay road taxes or traffic fines, order birth certificates, or electronically sign receipts from one online location.



Traffic Infringement Notices Sent within 3 days rather than 120 days

Enhanced Security



Citizens Served Per Day Increased from 3,000 to 30,000

70 Million Seamless Ride Bookings Per Year Powered by Red Hat Decision Manager

LogistiCare®

"We anticipate moving from large software releases quarterly to functional releases monthly, with system refinements happening as often as weekly," Our IT organization is now a responsive partner with a business focus."

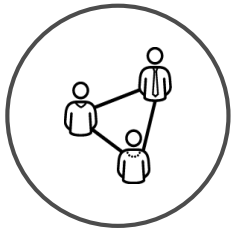
- MICHAEL QUINTERO
ENTERPRISE SOLUTIONS ARCHITECT
LOGISTICARE

CHALLENGE

Business has grown over 60% and the core app was not able to handle the growing scale and complexity of business. The app contained custom business logic that made meeting the evolving needs of clients & partners, increasingly difficult.

SOLUTION

- Saved $6Mn in operations by using **DM** to define complex rules for regulatory compliance, routing, payments, and ride scheduling.
- Adopted the OpenShift container platform to manage, deploy and scale apps and APIs, built using Red Hat Middleware.



Easier
Third Party
Integration

Operational
costs reduced
by $6 Mn

Increased
agent efficiency
by 15%

Case Study

Where do our participants apply AI automation?

Where do our participants apply AI automation?

Challenges

I am a **robotic process automation RPA** developer working for a major **bank**, and I am developing software robots to aid bank staff in automating tedious, but noncomplex tasks. There are few phases in the software development life cycle, and one of the difficulty we face is most likely **finalizing the business requirements**.

Another difficulty would be the business as usual BAU operations after development. Although we told the users to put in a specific file format (**RPA is not intelligent if we are looking at low cost solutions**), they will put in different formats causing the robot to fail. Hence we spend a bulk of time in development **writing exceptions** to prevent these.

What learnt is useful?

Firstly, this course has taught me how to use **KIE tool** (jBPM/Drools). This will definitely aid me in my development in the bank because I use a similar vendor product (Kofax Totalagility [KTA]). Although we use KTA to do basic BPM, we **do not integrate any intelligence** when using it, since most development time is short and they take man-hours budget into heavy consideration. So from this course I learnt to **integrate business process driven by a** (knowledge driven) **rule engine**. Also, by learning different techniques of reasoning, it will be helpful as a tool to help sketch out **multiple methods and models in deriving a smarter robot**. For example, since we deal with **lots of exceptions**, we can use a rule-based reasoning engine (for example, **guided decision table**) to resolve it to different scenarios, which would be **efficient** than having to write a line of code for every decision.

How/Where to apply to workplace?

We currently process company documents in one of our AML (Anti-Money Laundering) robots, which actively seeks for sanction words (example: nuclear) using OCR, which will be used to approve/reject loans by a customer. Right now, we have a process maker (operations staff), and a **checker (management)**. If a rule-based engine is well designed, it can even replace the checker. But a full replacement will not be recommended, and the checker should do double check. But this will **speed up document processing** in a day, improving efficiency.

Business values

Higher efficiency can be reached. In RPA we count profits by total hours saved. By introducing **more reliable and intelligent agents** in our robots, besides from human action assistance, we can replace human thinking cognition, thereby saving even more man hours.

Where do our participants apply AI automation?

Challenges

I work in a top **oil & gas** company as a **Pricing Tactics Advisor**. Among the big oil and gas firms and MNCs, our company is exceptionally known for their **rigor in business processes and controls**. For such a huge company, such traditional process and controls can hinder our speed to market, especially in the technology driven world. Many of our processes are **still very manual and excel based**, requiring many levels of endorsement and checks. These processes can be easily replaced with process automation tools.

What learnt is useful?

The **KIE tool** can easily replace many of the existing manual processes that we do. E.g. Email endorsements (sending to the right manager who has the right endorsement authority), request forms via email (many of these email request has missing info and we end up going back and forth. With a validation form, this will not happen).

Decision trees is also one of the relevant modules I have been using in my daily work as the Pricing Tactics Advisor when it comes to dynamic pricing.

How/Where to apply to workplace?

I have actually automated many of the existing **endorsement and email request** using Microsoft Sharepoint (paid software) workflow. It works in a similar concept as KIE.

I have been using JMP (paid software) to make numerous **dynamic/tactical pricing strategies**. Many of these strategies are first developed by exploring our historical competitors and transactional data using python in Jupyter notebook.

Business values

Our company has just begun on their **digital transformation** journey. I believe that the company of tomorrow is not one who has the most advanced technology, but the company who has the most amount of data. Many of the oil and gas firms are sleeping giants. We have a treasure trove of untapped data. It is a journey for us to move away from our oil and gas mind-set into the world of digital technology. I am leading the Asia Pacific Market Entry Strategy for China and we are **exploring new and lean ways** to do market entries without the baggage of traditional systems that the mothership is using.

Where do our participants apply AI automation?

Challenges

I build **credit risk** systems for the **bank**. The difficult part is:

1. There are huge number of credit policies, they **scattered around in many places**: within systems, excels, or in the human brains of those highly experienced account managers, they are **not synchronized**.

2. **Polices keep on changing** due to policies changing, regulatory requirements, etc. Some policies were built in the system and **logic were coded in programs**. It took very long time to adjust them as standard system development life cycle SDLC kicks in.

3. There is no centralized knowledge base which serve as the golden source of rules, there is also no centralized data taxonomy, which causes **conflicting results** and no one can tells which one is correct.

What learnt is useful?

The **KIE suite** is very useful in terms of **building and testing the policies** in the bank credit departments.

The **business users** could use the graphic tools to come up the flow, input their rules as guided decision table, auto generate the forms if input is required, and quickly start their testing on the new policies. (**rather than wait for tech team to finish the coding and test**)

For tech team, we could either code the tested policies into the legacy systems, or use the KIE suite to **expose the policies/rules into application programming interface API**, and simply call it.

This will significantly **shorten the turn around time** for new policies launch.

How/Where to apply to workplace?

Take the policies as example, we could easily **de-couple** the coding part and the logic part between development team and business team.

The business team could focus on the policies and come up the list of **mutually agreeable rules table in excel sheet**, track them in version management tools such git, to make all the rules traceable, and prevent multiple conflicting version.

Whenever there is need to change rules, the credit system will **simply load the excels and the polices are live**. **No software deployment** is required, this will avoid the software bugs which happens quite often for typical code deployment.

Business values

It **reduces the time** cost of launching new policies: as it will be shorter development time, shorter testing and deployment time.

It **decouples** the business logic and technical details, **easier for maintenance** and future system migration, which again saving cost.

Where do our participants apply AI automation?

Challenges

I work in a **Systems Integration** company. Here we have multiple large-scale projects which require customization, development and implementation. It is difficult to manage scheduling and assignment of development effort to projects (due to skillsets, availability, etc.).

Also, as the company has been around for quite a while, much of the processes are still **manual and archaic**. As people come and go, the initial processes are no longer adhered to and there is **not much visibility** on them.

What learnt is useful?

KIE tool can encode the various **decision factors** for certain processes like (leave, scheduling of staff to projects). It also allows for **multiple users** to interact and utilize the system at once.

For example, in my company there are many projects and developers. KIE can help to automate the assignment, monitoring and scheduling of developers to projects.

How/Where to apply to workplace?

First, it makes sense to **map out the current given process** within my company. For example, I've recently done a Business Process Re-engineering to improve the Recruitment Process in my company. Using KIE, I can map out the process and include the business rules/ logic that is used to decide.

Secondly, **include the business logic** into the Recruitment Process. For example, the salary approval for certain staff rank must be routed and go through the Head of HR or to the Head of the Business Unit. This can be mapped within KIE and sent to them for approval.

Lastly, on-board users to utilize this automated process. KIE can be used as the system in which to **implement the automated process**.

Business values

One business value that can be derived is to **decrease** the required manual effort for writing out all the **physical forms**. Another is to **visualize** and provide awareness of the current **process**. A third is to ensure that the process is **fair** and not biased.

Where do our participants apply AI automation?

Challenges

I worked in a **charity** called Singapore Children's Society. My work involves **conducting research** on issues concerning the well-being of children, youth and family e.g., child abuse and bullying. One of the main work challenges in my field of work is **translating scientific findings into practices that social workers can then use to help their clients e.g., children and youths.**

What learnt is useful?

The most helpful thing that I had learnt from this course is **how to take the acquired knowledge that I had gained from my own research and from other's research findings and convert them into rules.** For example, I have converted these research findings into decision trees knowledge model and rules that I then give to social workers **to assist their decision-making**.

The **KIE tool** can support better to the social workers because it can be automated thus I do not need to sit down with social workers every time there is a change in the model. KIE can be scaled up to **support multiple users**, which help us a lot because **we are a small team with little manpower**. The other thing is that KIE can **generate reports easily**, which makes it easy to report to management on **how things are progressing** without having to spend time doing up reports. This leave us with more time to take on more higher value work.

How/Where to apply to workplace?

I used KIE to generate a small project based on the decision tree that ask the social workers to fill in the inputs in order to generate a set of recommendation on how they can work with their clients. For example, my research investigated whether certain demographic profile of children was more at risk of child abuse. I looked at variables such as race, age, gender, parental education level and examine the association with child abuse victimization. **I then use these findings to build a decision tree to derive simple rules to fit into the KIE project/system**.

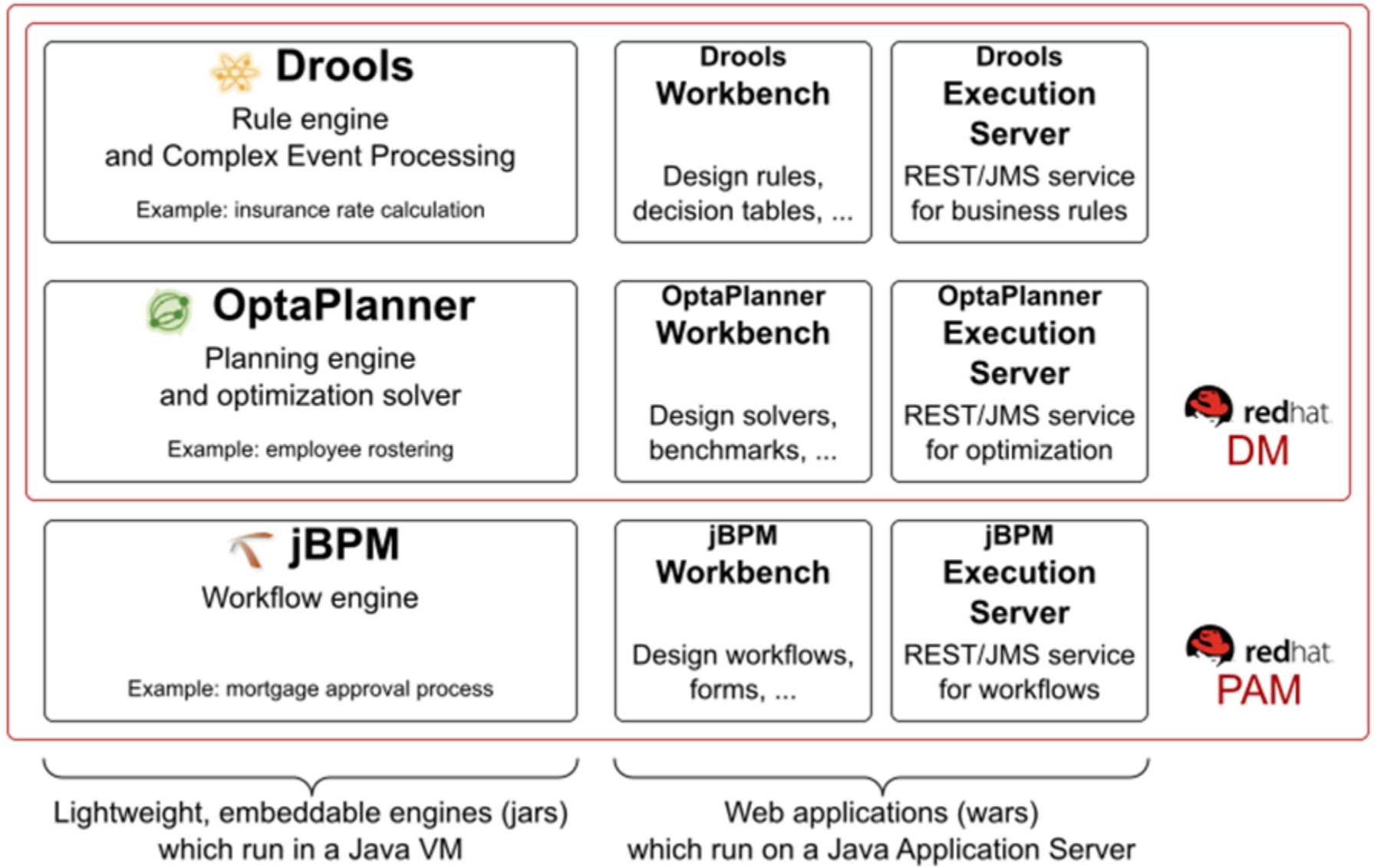
Business values

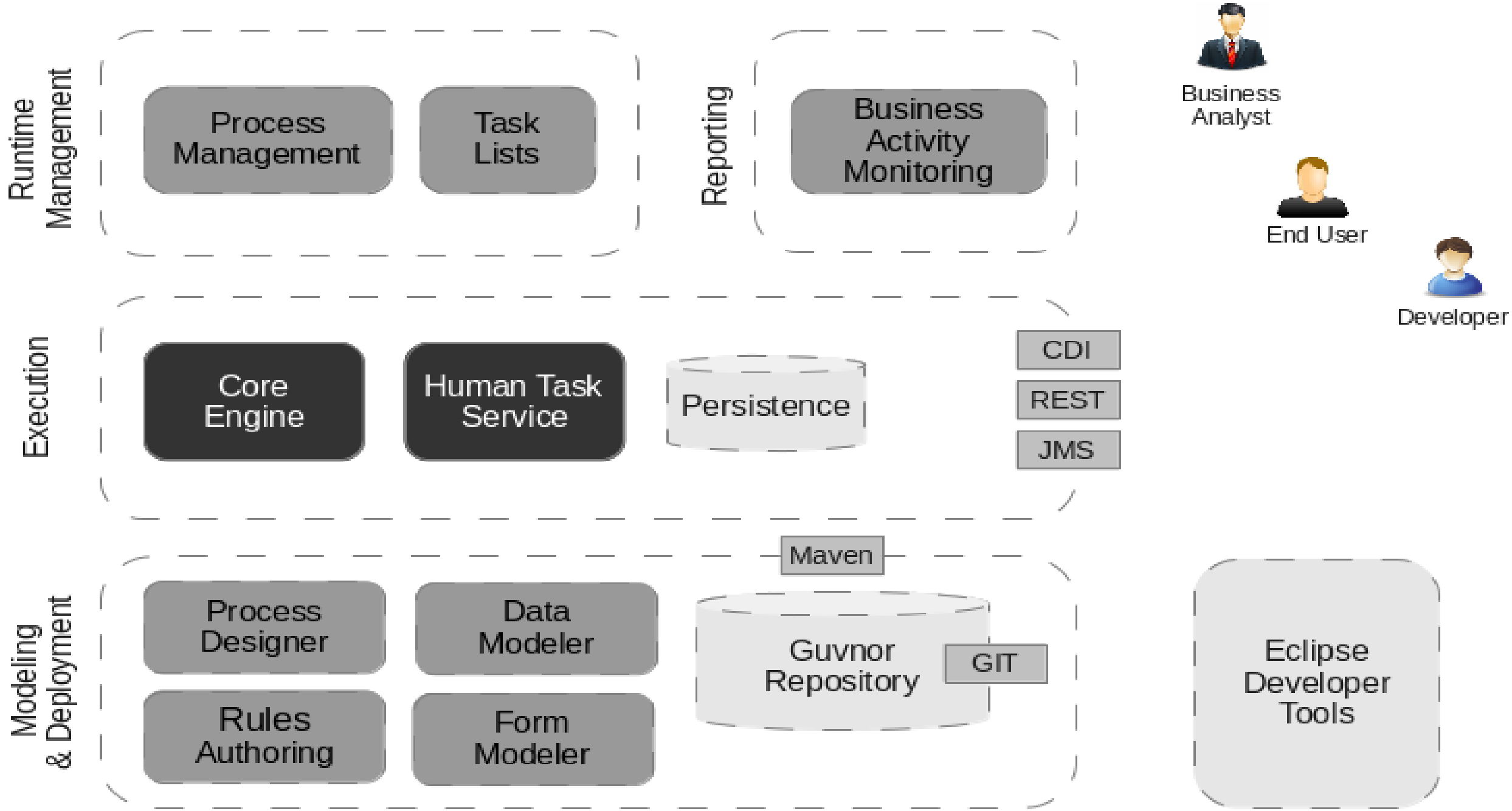
Because of the course, I had learnt to implement a **automated machine reasoning systems** that did part of my work for me. The business values derived from this is that my knowledge is now readily available to social workers, **knowledge can be updated easily**, social workers is now better able to use the knowledge because it has been translated into easily applied rules, and I can focus more on **higher values work** such as doing more research.

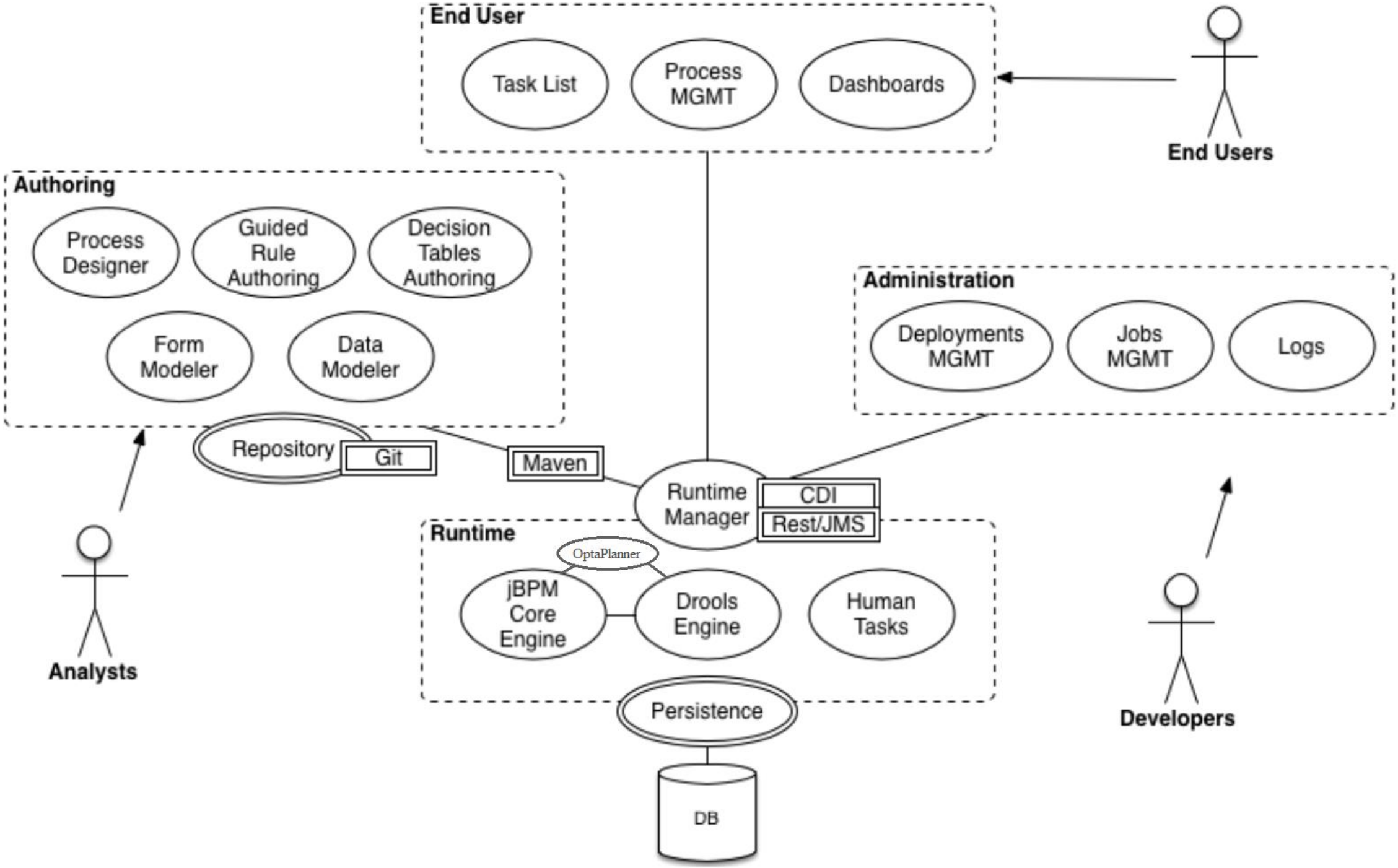
KIE System Architecture

KIE functionality overview

What are the KIE projects?




Runtime Management
Process Management
Task Lists
Reporting
Business Activity Monitoring
Business Analyst
End User
Developer
Execution
Core Engine
Human Task Service
Persistence
CDI
REST
JMS
Maven
Modeling & Deployment
Process Designer
Data Modeler
Guvnor Repository
GIT
Rules Authoring
Form Modeler
Eclipse Developer Tools


End User
Task List
Process MGMT
Dashboards
End Users
Authoring
Process Designer
Guided Rule Authoring
Decision Tables Authoring
Form Modeler
Data Modeler
Repository
Git
Maven
Administration
Deployments MGMT
Jobs MGMT
Logs
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CDI
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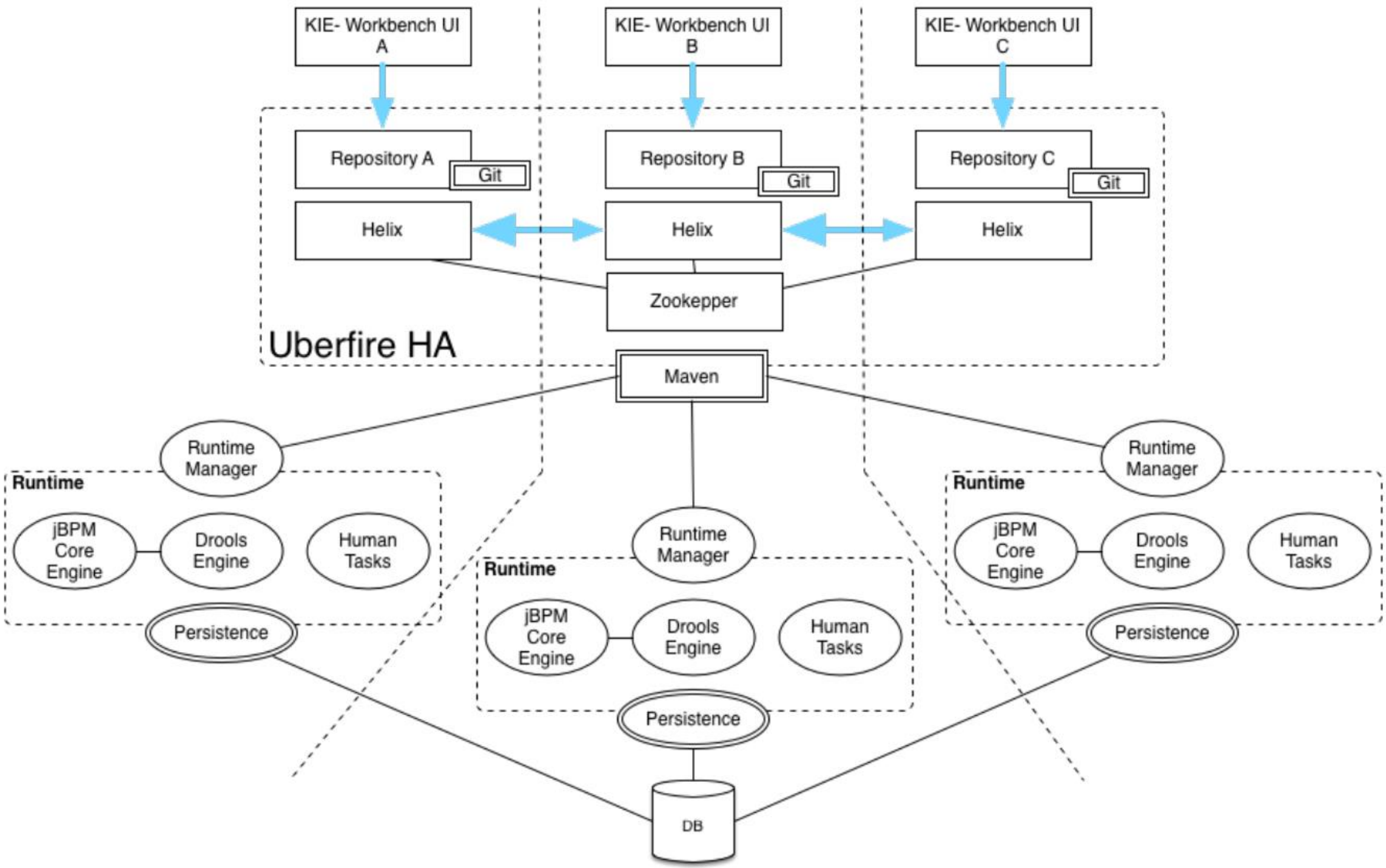
Runtime
OptaPlanner
jBPM Core Engine
Drools Engine
Human Tasks
Persistence
DB
Analysts
Developers


KIE- Workbench UI A
KIE- Workbench UI B
KIE- Workbench UI C
Repository A
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Runtime
jBPM Core Engine
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Persistence
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Drools Engine
Human Tasks
Persistence
DB

End of Appendices

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