



# Intelligent Linux Test Suite

SAN19-112



**Linaro**  
**connect**  
San Diego 2019

# AGENDA

- Model Overview
- Model Usability
- Sample Questions & Model usage
- Potential Use cases
- References

# ILTS (Intelligent Linux Test Suite)

1

## Generic questions:

- Is upstream status ok to cut a distro for eg SUSE, RedHat
- What should be \*must\* test cases for a new platform in upstream or LSDK
- Should I use LSDK or upstream for my SW product?

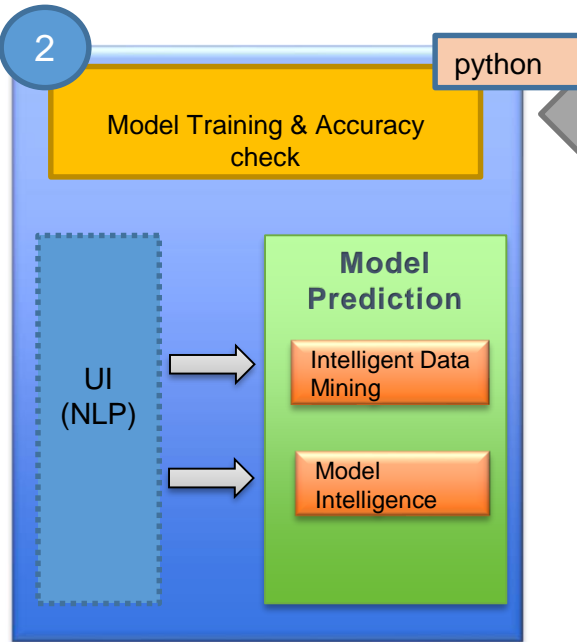


4

## Model Standard questions:

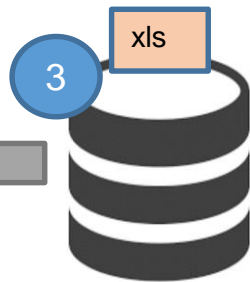
- [1] Predict Pass/Fail for a Test case
- [2] Predict Pass/Fail test cases for a platform
- [3] Predict Pass/Fail test cases for a IP in platform
- [4] Predict IP subsystem stability
- [5] Predict Release stability
- [6] Exit

2



3

xls



Test reports

NXP- Kernel-CI  
NXP LSDK

Kernel-CI  
LKFT  
JIRA

# Model Usability

1

Prediction based on existing inputs  
(Intelligent Data Mining)

1

- Is upstream status ok to cut a distro for eg SUSE, RedHat?
- Does LX2160 qualify for SUSE distro?
- Should I use LSDK or upstream for my SW product?
- If I want to rebase my branch with latest upstream what should be a good regression suite?

2

Predictions based on new inputs  
(Model Intelligence)

2

- What should be \*must\* test cases for a new platform in upstream or LSDK
- If a test case pass/fail for one existing platform. Will it pass/fail for other platforms in LSDK or upstream

# A sample Question & Model usage

- Intelligent Data Mining

1

Does LX2160 qualify for SUSE distro?

- Please tell the status of LX2160 in upstream
  - Option [2]
- Can I define a optimized regression test suite to sanitize LX2160 for SUSE?
  - Option [2]
- Which IPs need to be ported from LSDK?
  - Option [4]

Model Standard questions:

- [1] Predict Pass/Fail for a Test case
- [2] Predict Pass/Fail test cases for a platform
- [3] Predict Pass/Fail test cases for a IP in platform
- [4] Predict IP subsystem stability
- [5] Predict Release stability
- [6] Exit

# A sample Question & Model usage

- Model Intelligence

2

I have new Platform LS1028A, Where should I add its support LSDK or upstream and what should be possible \*must\* test cases?

- Find stable release i.e. LSDK or Upstream
  - Option [5]
- Generate test cases by querying Each IP with “platform” having almost similar IP version. IP re-usability matrix will helpful here
  - Option [3]

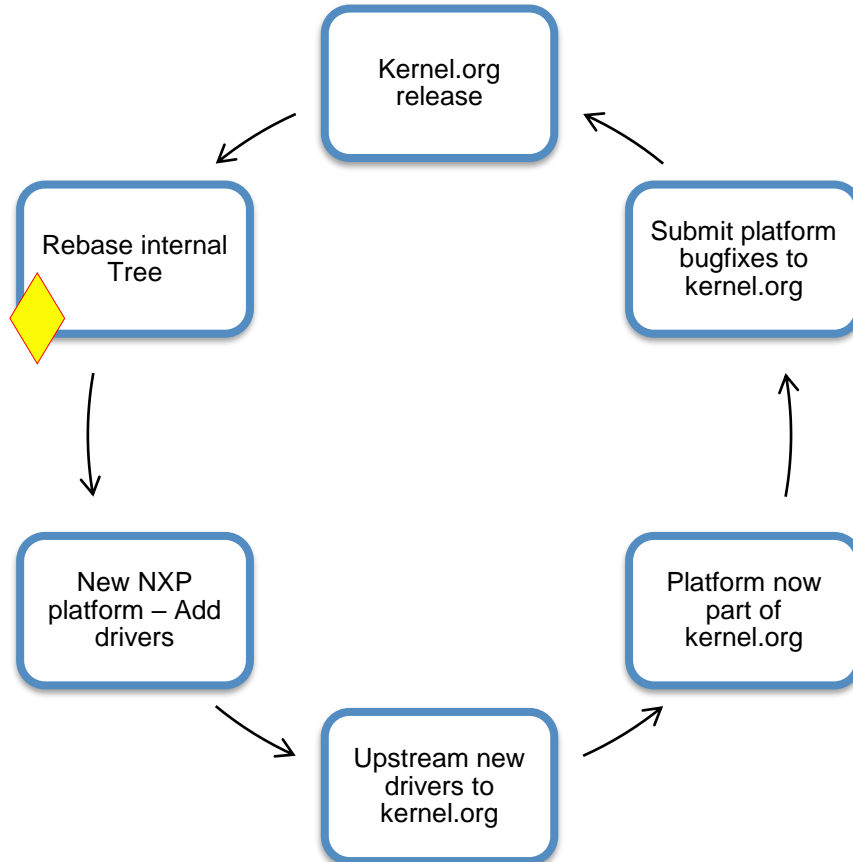
Model Standard questions:

- [1] Predict Pass/Fail for a Test case
- [2] Predict Pass/Fail test cases for a platform
- [3] Predict Pass/Fail test cases for a IP in platform
- [4] Predict IP subsystem stability
- [5] Predict Release stability
- [6] Exit

IP re-usability matrix

IP	Similar SoC
Cortex A72	LS1046A
FlexSPI	LX2160A
I2C	LX2160A
GPIO	LS1088A
SD/MMC	LX2160A
UART	LS1088A

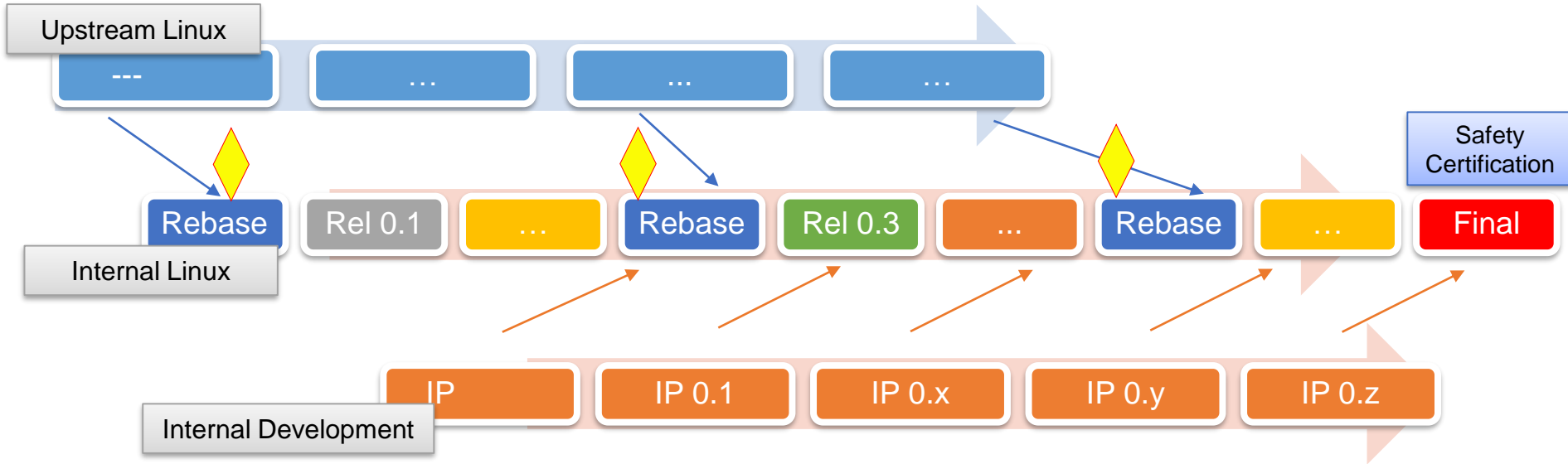
# Potential Use cases: Linux Safety with OSS development – Basic flow



## ◆ ILTS:

- Predicts Optimize test cases.
- It is getting trained via Test Report from various test cases i.e.
  - a) Safety Certification test cases
  - b) NXP LSDK-CI
  - c) NXP- Kernel-CI

# Potential Use cases: Linux Safety with OSS development – Safety Certification





# Other Use cases

- Collaborate with kernel CI, LKFT for having more test cases
- Helping Organizations in taking rebase related decisions
- Helping Distro Vendors in choosing correct LTS version
- Publishing Linux stability Scores and certification
  - At Subsystem wise
  - At Vendor specific
- Linux Safety- ELISA
  - Stability scores to identify safety violations
  - Identify potential safety related bugs- must to be resolved

# References

- Github link

[https://github.com/prabhukush/ai\\_models.git](https://github.com/prabhukush/ai_models.git)

# Thank you

Join Linaro to accelerate deployment of your Arm-based solutions through collaboration

[contactus@linaro.org](mailto:contactus@linaro.org)



Develop & Prototype on the Latest Arm Technology



9boards is a range of specifications with boards and peripherals offering different performance levels and features in a standard footprint.



**Linaro  
connect**  
San Diego 2019

# A) Predicting for existing inputs based on the historical data

- Is upstream status ok to cut a distro?
  - SUSE, RedHat?
- Does LX2160 qualify for SUSE distro?
  - Please tell the status of LX2160 in upstream
  - Can I define a optimized regression test suite to sanitize LX2160 for SUSE?
  - Which IPs need to be ported from LSDK?
- For a new SoC(IPs, similar SoC), should I branch out from upstream or LSDK?
- Should I use LSDK or upstream for my SW product?
  - SW specs: SoCs, key features
  - Customer
- If I want to rebase my branch with latest upstream what should be a good regression suite?
- I want a quick rebase, minimal sanity test?

# Predict Pass/Fail test cases for a platform

Does LX2160 qualify for SUSE distro?

Q1. Please tell the status of LX2160 in upstream

Answer: % pass, % fail

IP wise pass %, fail %

Q2. Please tell the status of LX2160 in LSDK

Answer: % pass, % fail

IP wise pass %, fail %

- Predict Pass/Fail for a Test case
- Predict Pass/Fail test cases for a platform
  - Predict IP subsystem stability for a platform
  - Predict IP stability
  - Predict Release stability
- Exit

# Is upstream status ok to cut a distro?

- Subsystem health?
- Platforms health? (LS1088A has seen more failures, LS1043A looks stable)
- IP health for a particular vendor
- Test cases which are must run (high probability of failing)

## Subsystem health?

Pseudo-code: For each sub system/IP (USB, PCIe, ethernet,...)

- For example for every USB TC#, pass/fail? If passes >80, USB is stable, do a minimal sanity...list the test cases which have been predicted as “may fail”
- Do this for all the subsystems
- If passes <50, IP is less stable, do a full testing, go over the list of predicted fails to assess the test coverage

## B) New Predictions- Model Intelligence

- Predict for new platform/ new IP/new test case: exact combination is missing.
  - Predict
  - And feedback and correct
- Predict for a new platform :LS1028 (one entry should be there)
  - Question for USB will tell based on subsystem health
- Predict for a new test case
  - USB OTG

Compare to human intelligence??