Intelligent Linux Test Suite
SAN19-112
AGENDA

● Model Overview
● Model Usability
● Sample Questions & Model usage
● Potential Use cases
● References
ILTS (Intelligent Linux Test Suite)

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?

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
[6] Exit

Python
xls
NXP Kernel-CI
NXP LSDK
Kernel-CI
LKFT
JIRA

Test reports
Model Usability

Prediction based on existing inputs (Intelligent Data Mining)

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

Predictions based on new inputs (Model Intelligence)

1. What should be *must* test cases for a new platform in upstream or LSDK
2. 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

Does LX2160 qualify for SUSE distro?
  - Please tell the status of LX2160 in upstream
    - Option [2]
  - Can I define an 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
[6] Exit
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]

IP re-usability matrix

<table>
<thead>
<tr>
<th>IP</th>
<th>Similar SoC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cortex A72</td>
<td>LS1046A</td>
</tr>
<tr>
<td>FlexSPI</td>
<td>LX2160A</td>
</tr>
<tr>
<td>I2C</td>
<td>LX2160A</td>
</tr>
<tr>
<td>GPIO</td>
<td>LS1088A</td>
</tr>
<tr>
<td>SD/MMC</td>
<td>LX2160A</td>
</tr>
<tr>
<td>UART</td>
<td>LS1088A</td>
</tr>
</tbody>
</table>
Potential Use cases: Linux Safety with OSS development – Basic flow

- **Kernel.org release**
- **Submit platform bugfixes to kernel.org**
- **Rebase internal Tree**
- **Platform now part of kernel.org**
- **Upstream new drivers to kernel.org**
- **New NXP platform – Add drivers**

**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

Upstream Linux

---

Rebase

Internal Linux

Internal Development

Rel 0.1

Rel 0.3

Rebase

Final

IP

IP 0.1

IP 0.x

IP 0.y

IP 0.z

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
Thank you

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

contactus@linaro.org
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 an 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??