**Problem Statement**

Pre-Silicon Debug at Chip Level takes considerable effort and consumes about 30% of chip design cycle time. Often bugs are sighted late in the design-cycle resulting in re-work, re-spin and tremendous cost to company.

Following are the objects of the Automation,

<table>
<thead>
<tr>
<th>Objective</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Repository for failure knowledge</td>
<td>If the failures are well documented in the tool, helps in easy coordination and communication.</td>
</tr>
<tr>
<td>Automatic triaging</td>
<td>Reduce manual effort on well known signatures.</td>
</tr>
<tr>
<td>Meaningful bucketing</td>
<td>Improve bucketing by incorporating architecture &amp; transaction knowledge.</td>
</tr>
<tr>
<td>Assist in prioritization</td>
<td>Prioritize failures based on transaction types, signature frequency, DUT configuration etc.</td>
</tr>
<tr>
<td>Team co-ordination</td>
<td>Need for efficient co-ordination and effective in cross-site communication.</td>
</tr>
</tbody>
</table>

**Automation Architecture**

- **Automation Architecture Model**
  - **Rule Based Architecture Model**
    - **Exact Rule Match**
      - **Known Bug**
        - **Bug DB**
          - **Transact Error**
            - **Seed, Test Configuration**
              - **RTL Version**
                - **Testcase Name**
                  - **Transaction Signature**
                    - **Error Description**
                      - **See d No**
                        - **Testcase Name**
                          - **Simul ation Fail ure**
                            - **Path A**
                              - **Path B**
                                - **Path C**

- **Over-all savings from method**
  - **Regression/Log Reports**
    - **Checker Error Based Classification**
      - **Signature Based Classification**
        - **Number of Buckets In**
          - **Typical Weekly Regression**
            - **Number of known buckets**
              - **auto triaged**
                - **10 to 15 (approx. 3%)**
                  - **10 to 20 (approx. 30%)**
        - **Number of buckets**
          - **debugged every week**
            - **150 to 200 (50% to 70%)**
              - **Usually 100%**
        - **Life of bug in Full chip**
          - **Typically between 3 to 5 weeks to record a new signature**
            - **Typically 1 week to record new signatures.**
        - **Cross GEO co-ordination**
          - **Every day stand-up meeting in morning**
            - **Followed by late night sync-up in 1:1 with counterparts on debug progress**

- **Search, Match, Update**
  - **Known failures meta data (aka signature) is stored with in database.**
  - **Rules are coded to indicate match with known signatures.**
  - **Exact match triggers auto-triage.**
  - **When Exact match is not present, match with high correlation is looked for.**
  - **A high correlation leads to a new bucket entry formed.**
  - **A low correlation index triggers manual entry creation in signature database.**

- **Pre-Silicon Debug Automation using Transaction Tagging and Data-Mining**
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