

# Accelerating Debug with Experience-Driven Insights: A Tool-Based Approach for IP and SoC-Level Verification

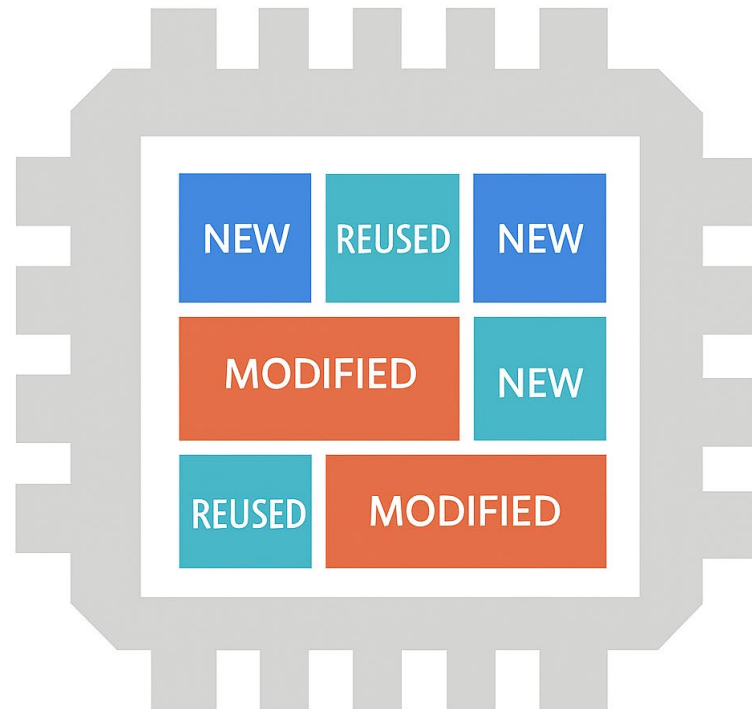
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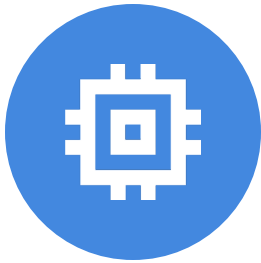


# Design blocks in typical SoCs

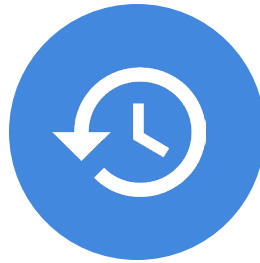
- 60–70% -reused or modified blocks.
- 30–40% -new blocks.



# Verification Challenges



**Complex  
SoCs**



**Long  
runtimes**



**Debug**



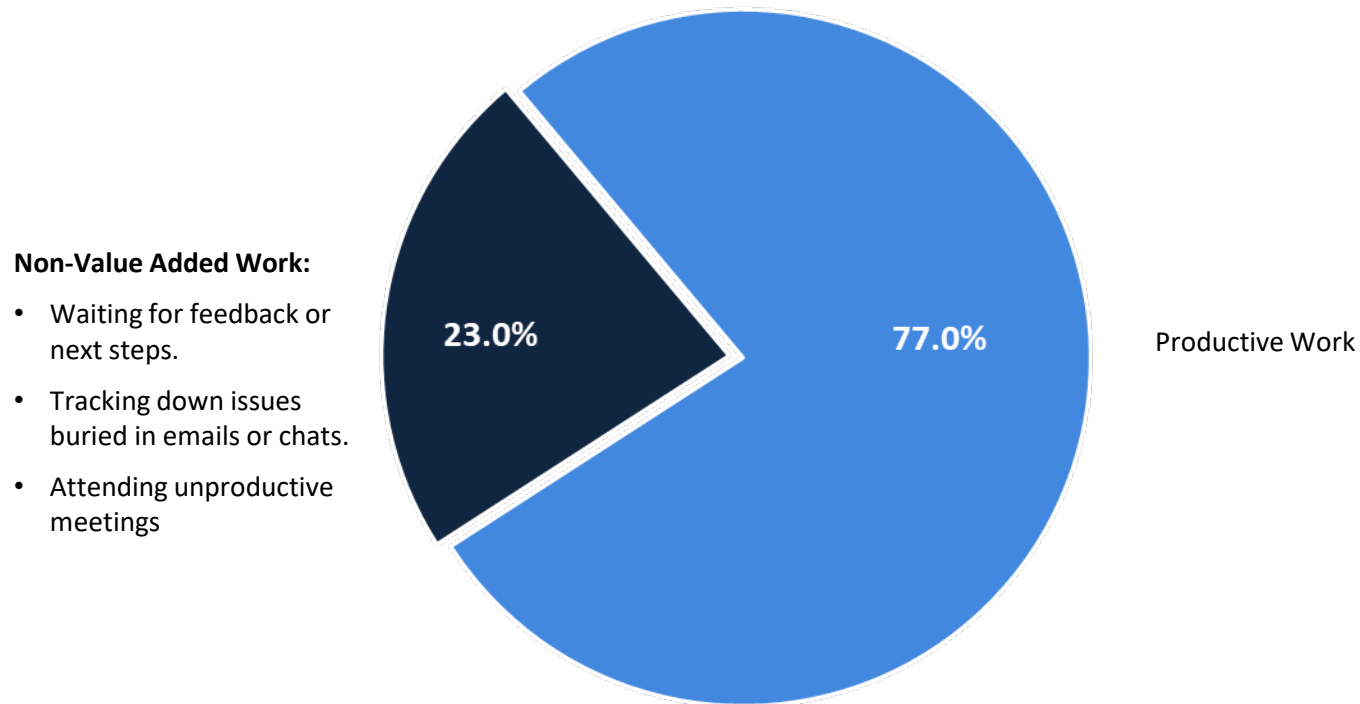
**Coverage  
closure**

# Verification of modified IPs

- Highly underrated task !
- New engineers face a steep learning curve

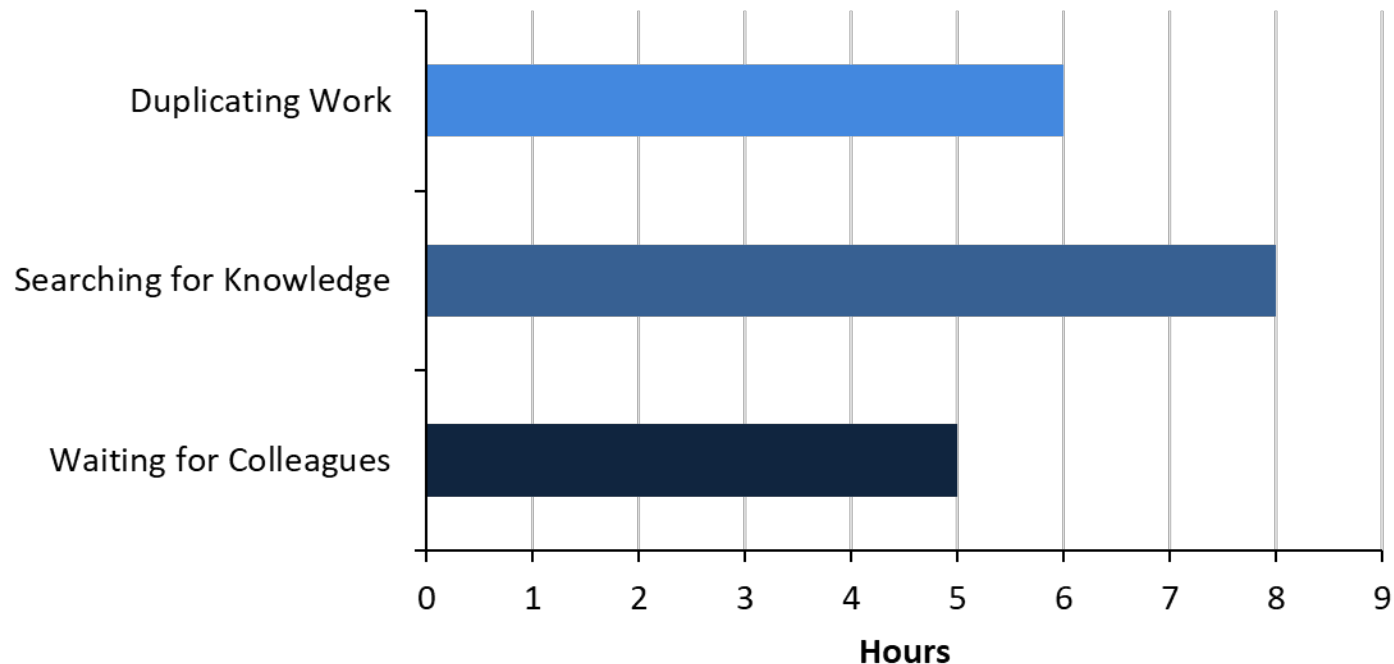
# Statistics

Engineering Time Distribution (CoLab Research)



# Statistics..

Panopto Survey: Time Lost per Week Due to Knowledge Inefficiencies



# Problem

**DEPENDENCY**

# Traditional solutions

- Messaging platforms – slack
- Documents
- Ewikis
- Bugtracking tools - Jira



# Traditional solutions..

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- Ewikis
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**UNSTRUCTURED,  
HARD-TO-SCALE**

# Solution

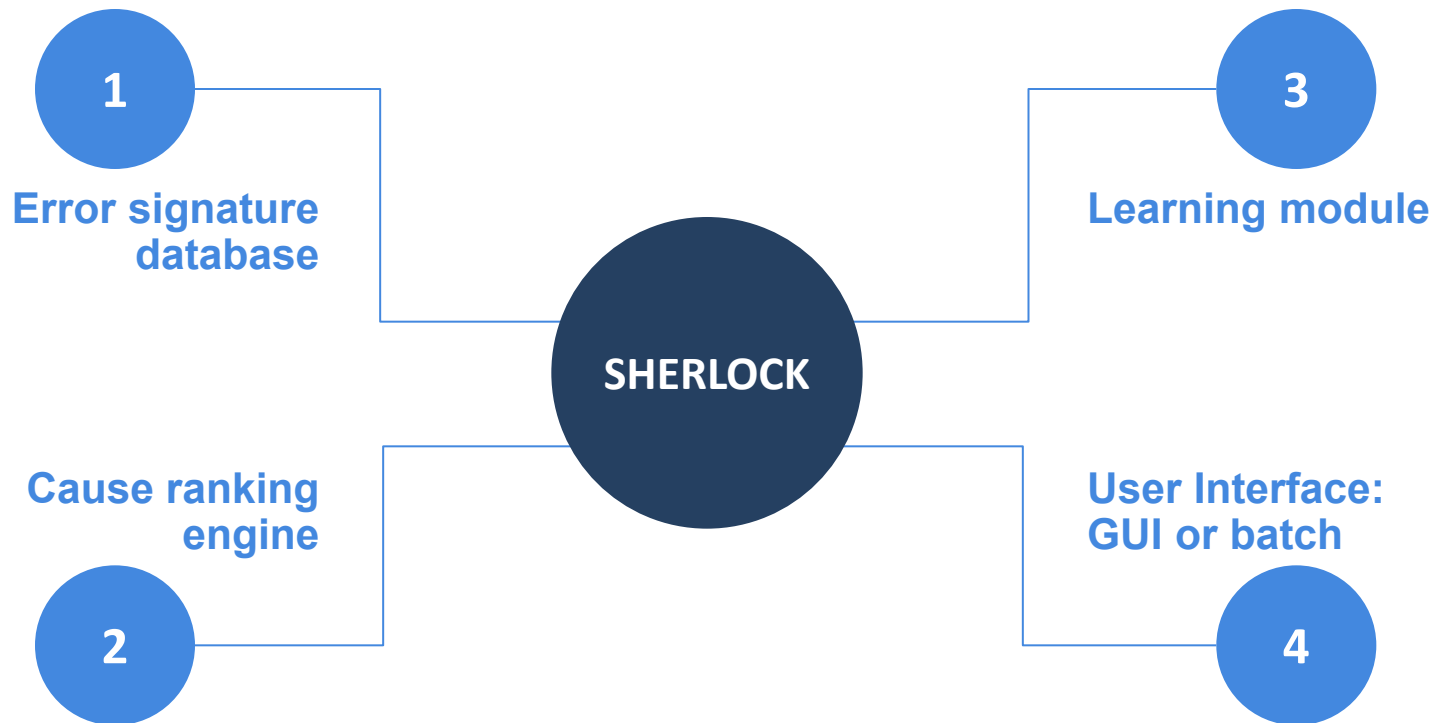
- A tool that captures and reuses debug-knowledge via error signatures and likely root-causes

# Solution..

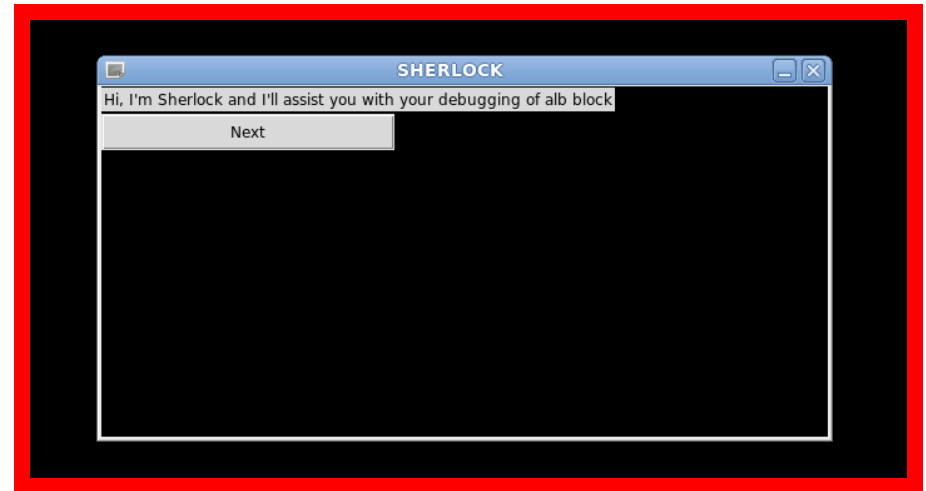
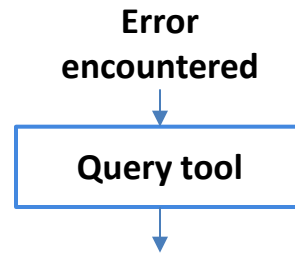
- A tool that captures and reuses debug-knowledge via error signatures and likely root-causes

**SHERLOCK**

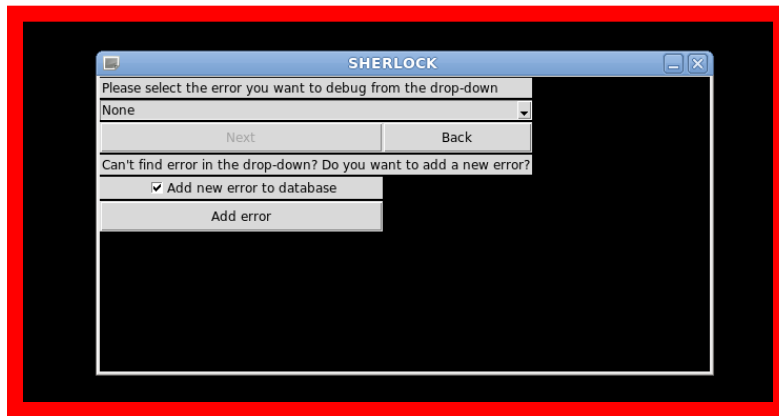
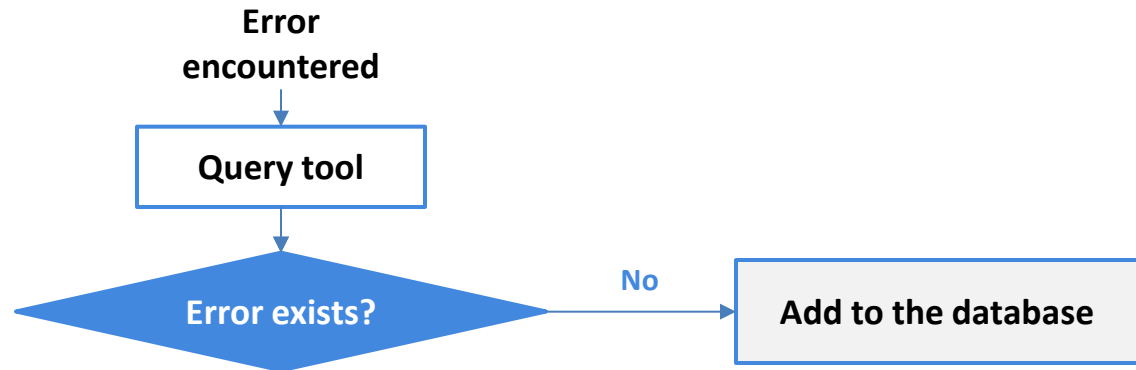
# Core components



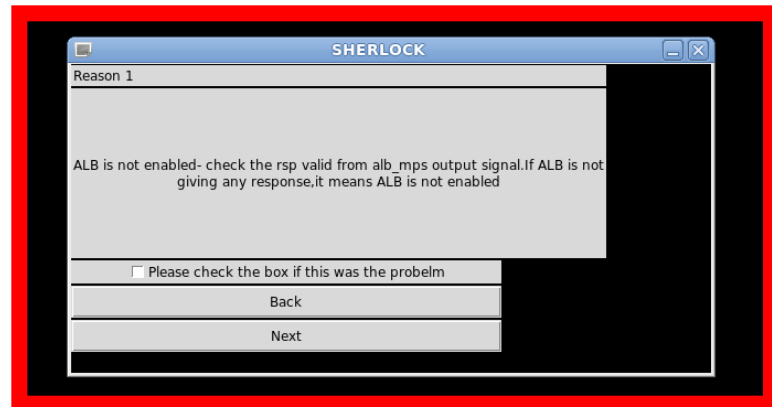
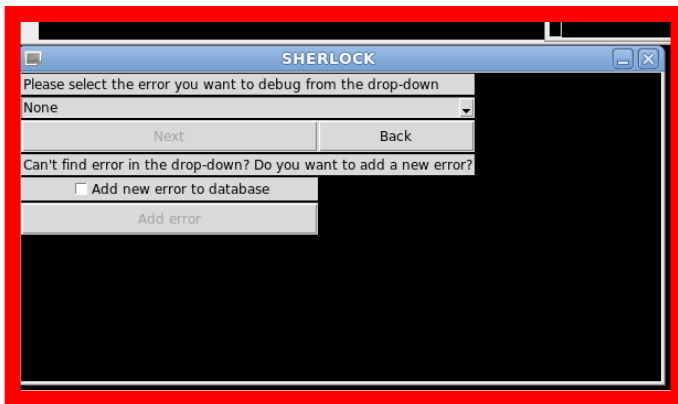
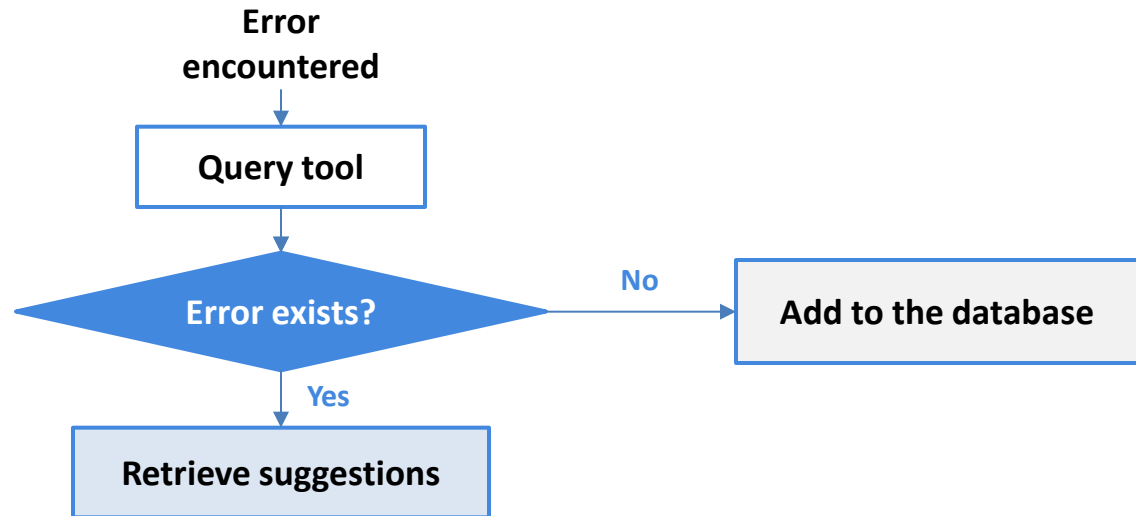
# Workflow overview



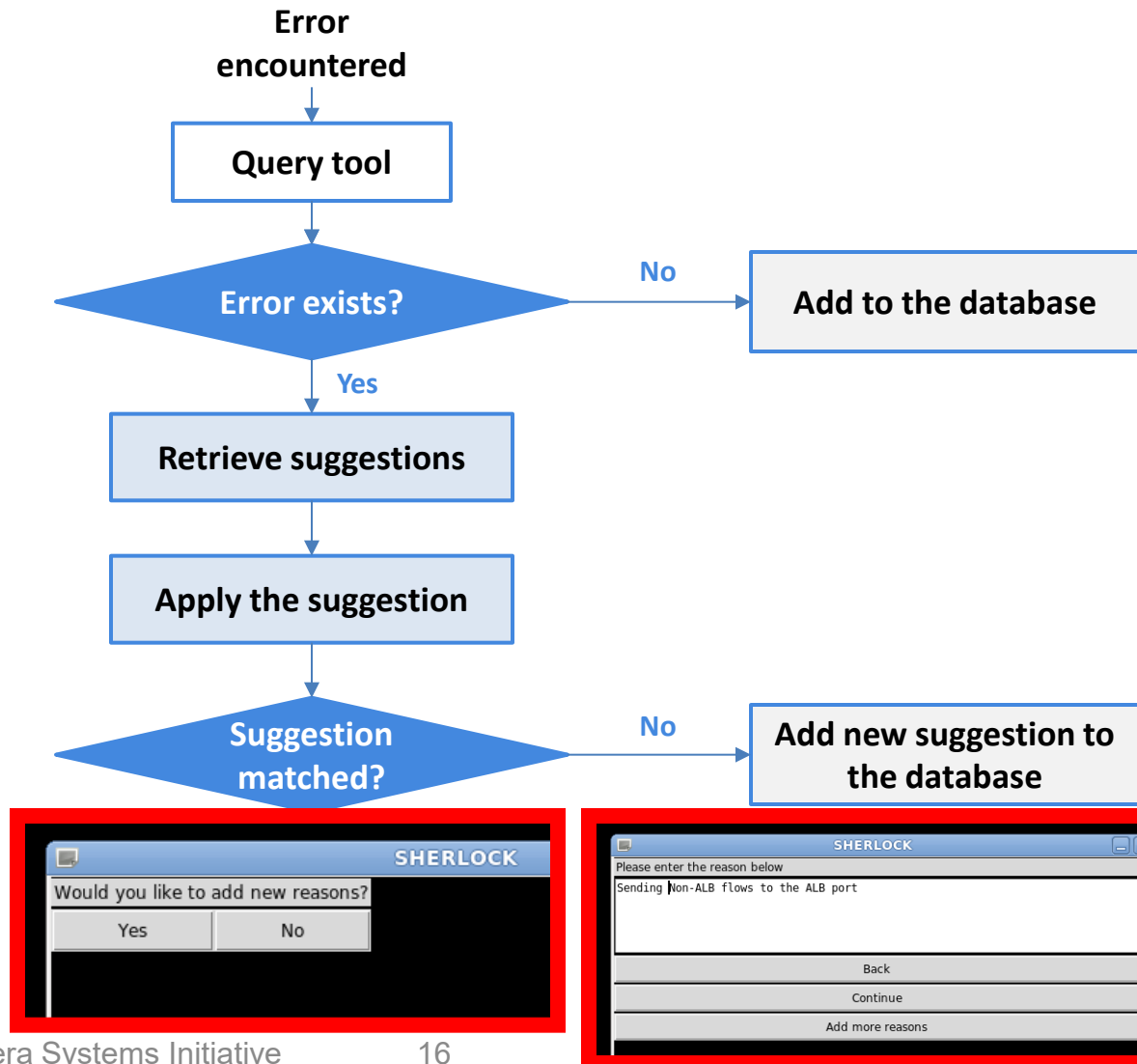
# Workflow overview..



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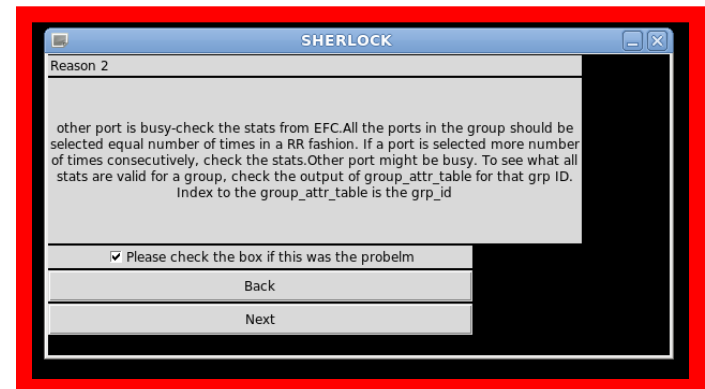
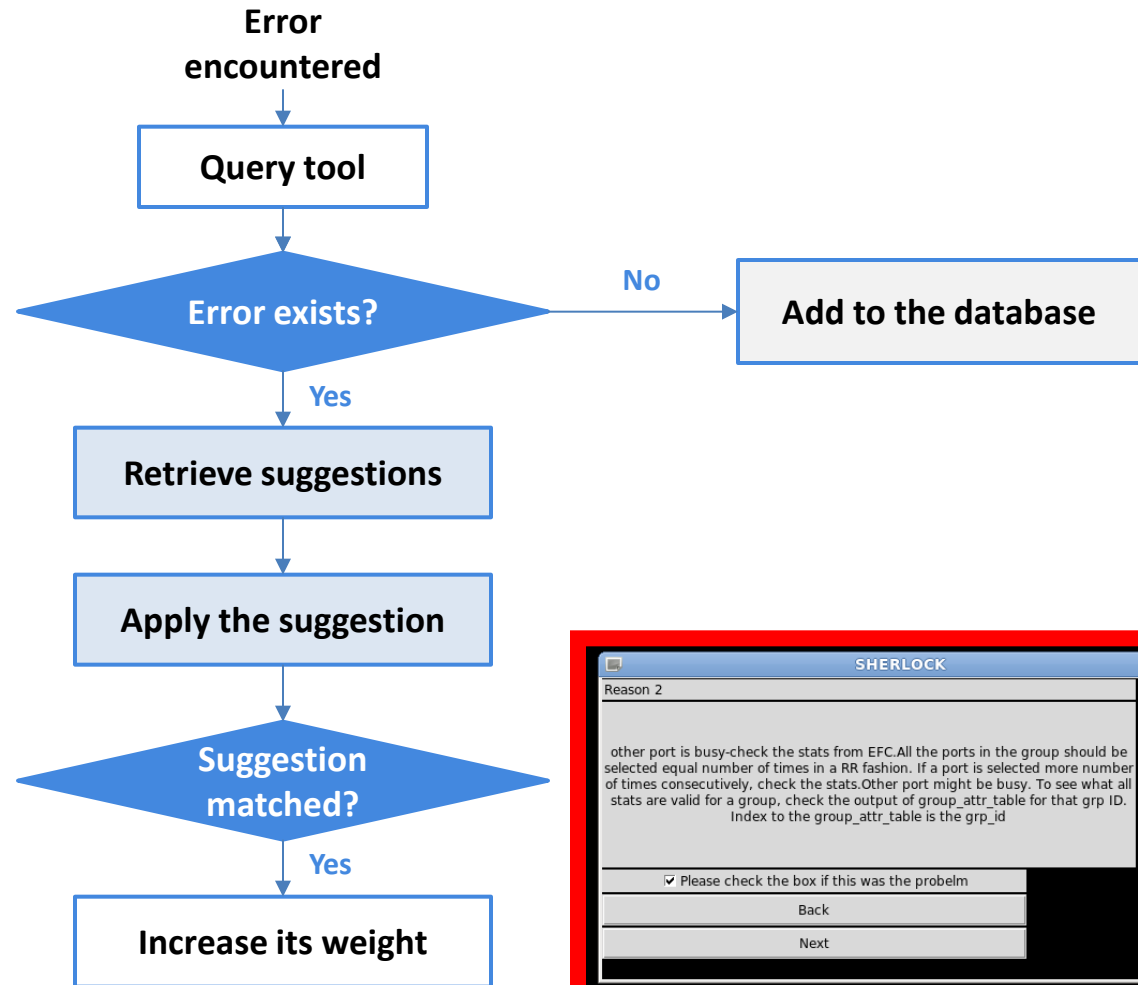


# Workflow overview..

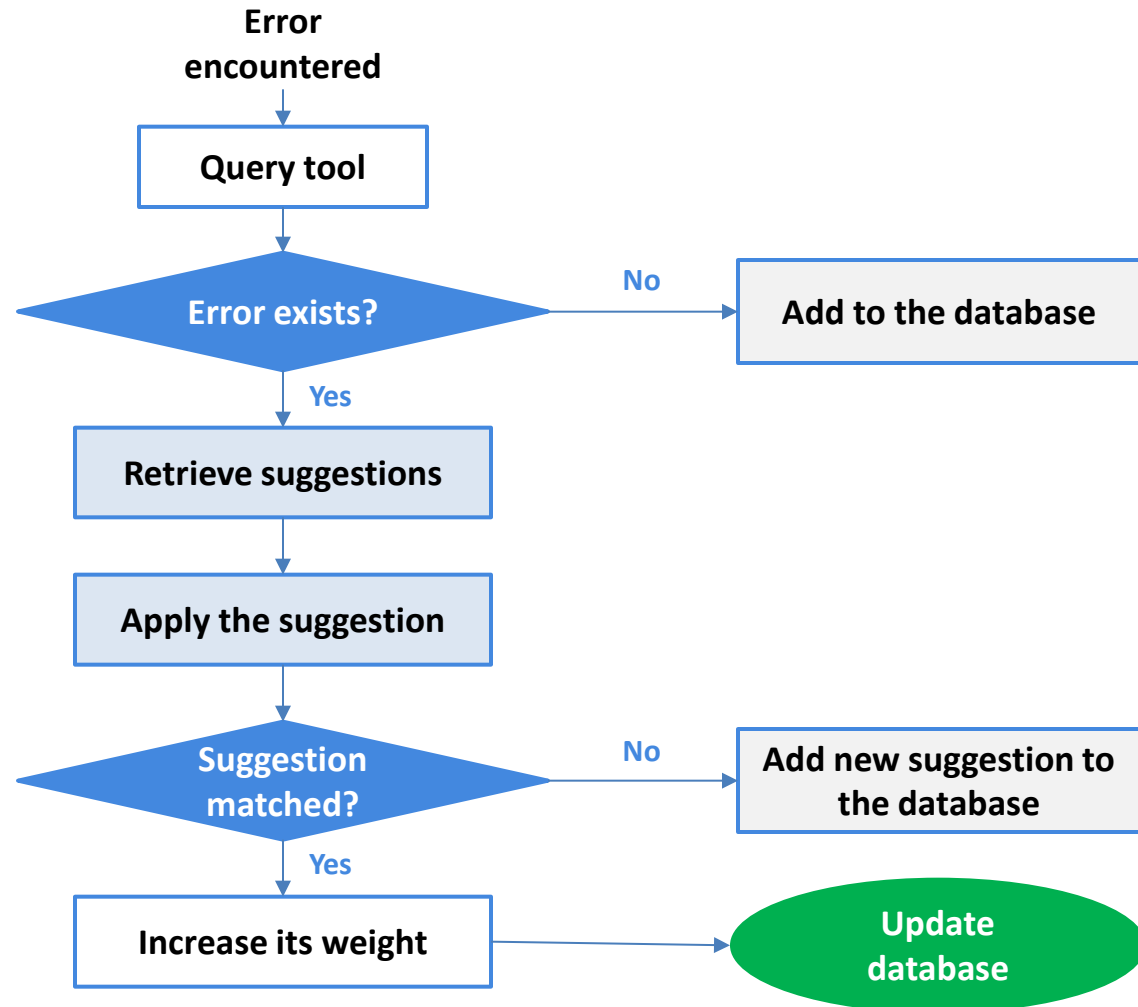




# Workflow overview..

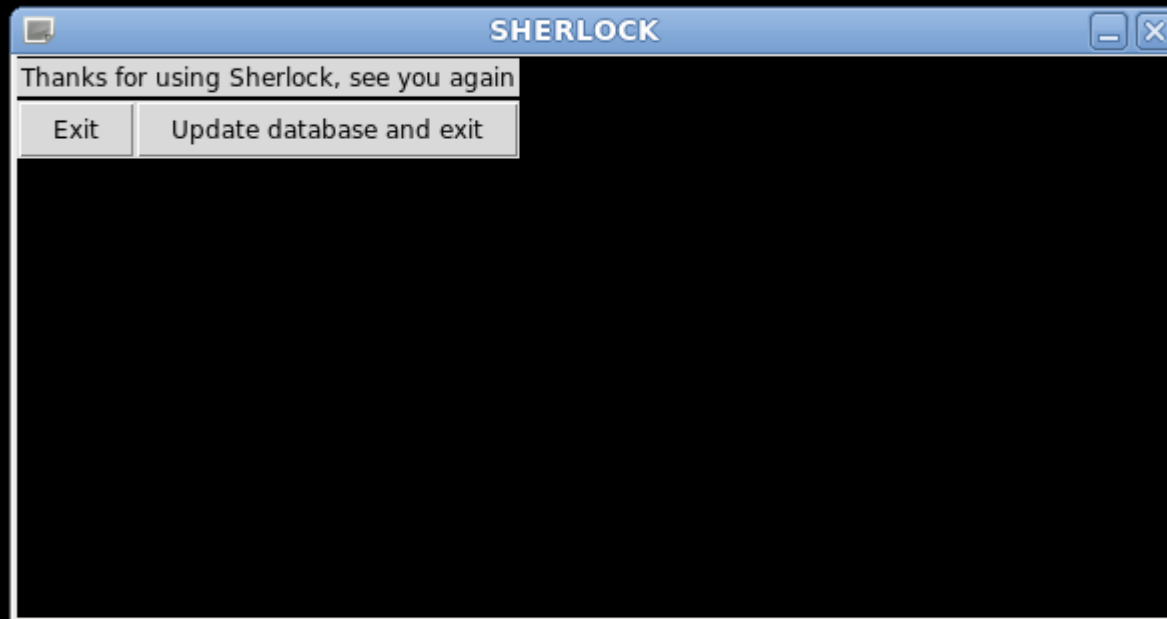


# Workflow overview..



# Workflow overview..

Update  
database



# Advantages

1

**Reduces  
dependency on  
prior engineers for  
debug knowledge**

2

**Accelerates root  
cause identification  
by leveraging past  
experience**

3

**Continuously  
improves as more  
data is added**

4

**Scales across teams  
and projects, esp  
useful in reused IP  
scenarios**

5

**Reduces  
onboarding time for  
engineers new to a  
block**

6

**Minimizes delays  
caused by engineer  
unavailability or  
time zone  
differences**

7

**Preserves and  
scales tribal  
knowledge across  
teams and projects**

8

**Improves  
consistency and  
speed in debug  
practices**

# Example

**Modified IP takes 6 months to finish.  
Based on Panopto Survey:**



## **Time spent on dependencies**

- 19 hrs/week => 456 hrs in 6 months



## **With SHERLOCK**

- Dependency reduced by 50% => 228 hrs => 28 days

# Integration Strengths

## Setup Agnostic

Works with any company's verification flow.  
No Major infra changes needed

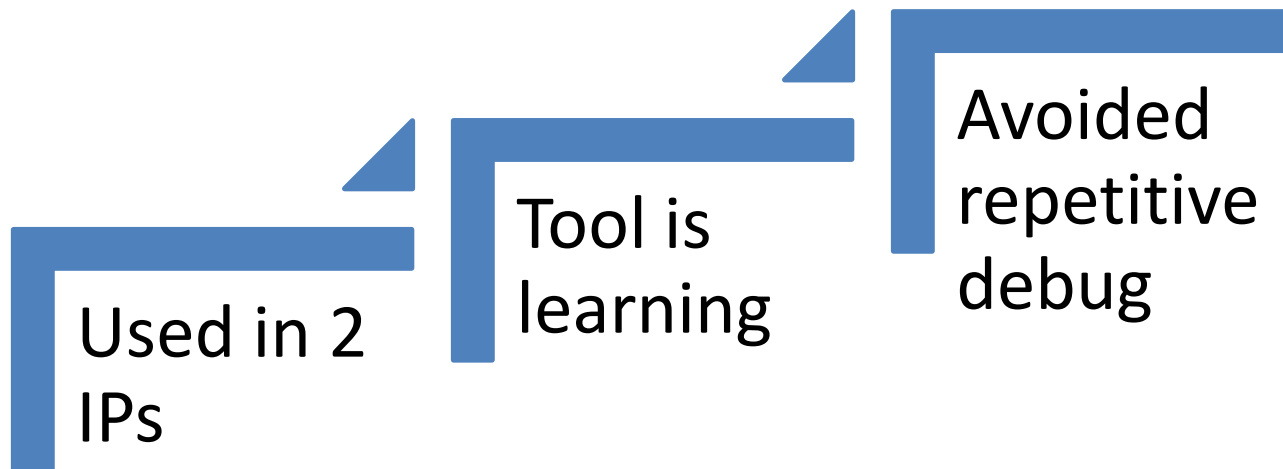
## Script Integration

Hooks into existing regression scripts

## IP & SoC Ready

Supports both IP and SoC verification

# Pilot Deployment Findings



# Pilot Deployment Findings..

## Self-Resolution

Engineers fixed recurring issues independently

## Weighted Ranking

Prioritized fixes based on likelihood

## Knowledge Sharing

Promoted collaborative debugging

## Actionable Pointers

Reduced time-to-fix with clear guidance

## Improving Accuracy

Gets better as database grows



# Limitations & Considerations

## Cold start

Effectiveness depends on data accumulation

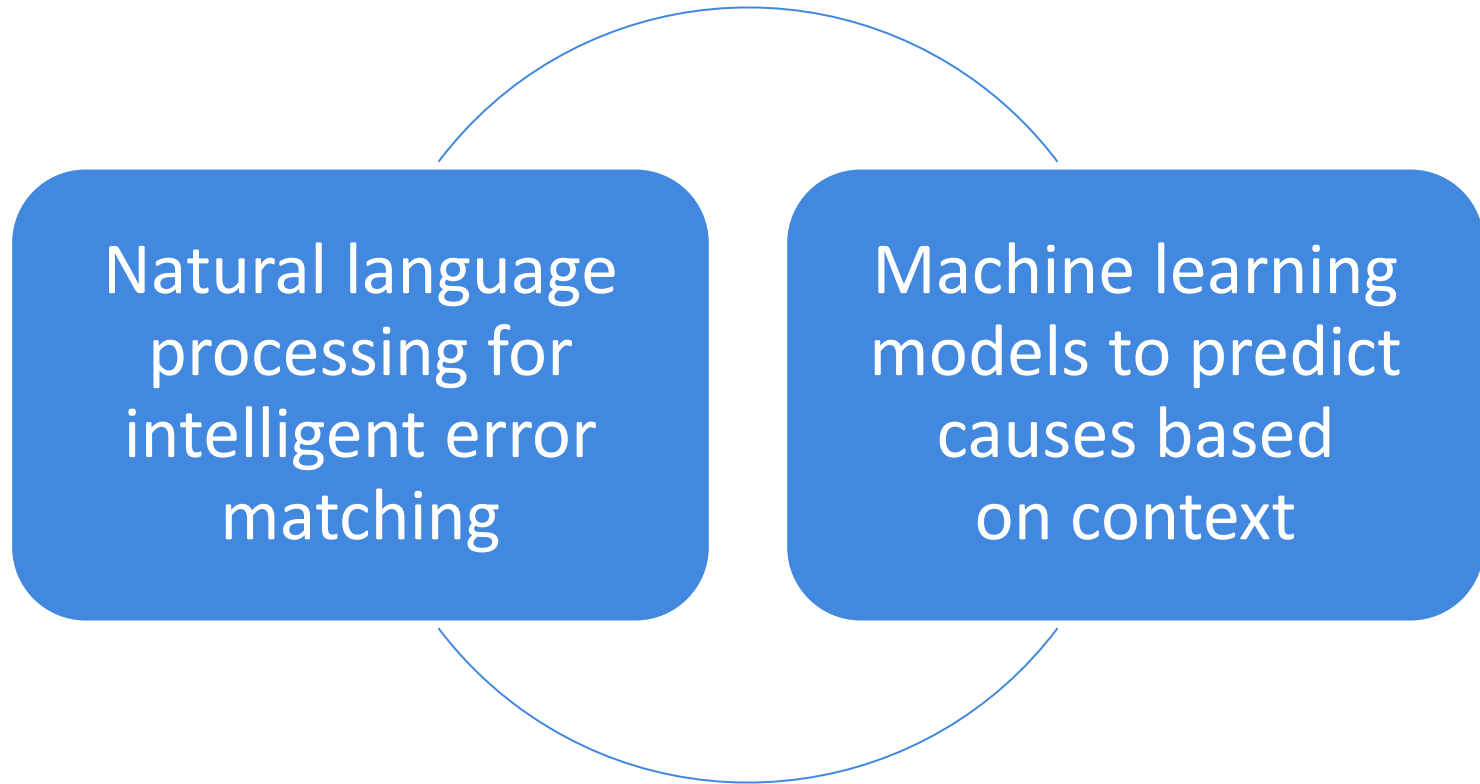
## Error Signature Variability

Normalization may be needed

## Engineer participation

Depends on active contributions

# Future Enhancements



# Questions