**Motivation**

- The resulting resilience characteristics of a series of program states can be scattered, lacking a holistic view for the users;
- To classify and summarize the unstructured resilience-related data generated by those approaches requires enormous efforts for large-scale HPC applications;
- There is no platform to post-analyze the results from different resilience frameworks.

**VISILIENCE Overview**

(A) Three resilience analysis models in Resilience Analysis part: Trident [2], IPAS [1] and Y-Branch [3];
(B) Data Generation part generate CFG data, and encodes the resilience analysis results into a unified format;
(C) Visualization Engine takes the formatted data and CFG data as input and outputs an interactive visual interface of the resilience analysis results.

**Data Generation (Cont.)**

The three analysis models above analyze resilience on different levels and output three data formats. The Data Transformer part encodes the resilience analysis result to a unified format shown in Figure 2 and passes it to the Visualization Engine.

The first line in resilience analysis json data in Figure 3 shows the unified format of data. The “node_number” and “edges” are the same as those in Figure 4 (a). The “label” and “value” of each elements are the Data Interface between Data Transformer and Visualization Engine.

**Visual Encoding**

- **CFG**
  - Nodes: Basic Blocks
  - Edges: Control Flows
  - Y-Branch
  - Nodes: Green/Red -> Y-Branch/not
  - Edges: Control Flow
  - IPAS
  - Nodes: Darkness -> Rates of SOC inst.
  - Edges: Control Flow
  - Trident
  - Nodes: Basic Blocks
  - Edges: Control Flow
  - Weights: SDC probability

**Interface and Web link**

- A Function view is a series of dots at top represent the functions;
- B The graph is shown in the Graph view and the nodes are basic blocks;
- C Weight threshold is used to set the weight threshold;
- D The functions with specific names are listed in Function List.

**Case Study**

In this poster, we present VISILIENCE, a visual resilience analysis framework to show the resilience analysis results to programmers in an intuitive way. VISILIENCE takes the Control Flow Graph as a layout and maps the resilience analysis data on it. VISILIENCE conducts three resilience analysis models and encodes these data into a unified data format, and visualizes the data into an interactive interface. The Visualization Engine provides several human-computer interactions, which help the users understand the data better. Multiple case studies have been conducted to demonstrate the effectiveness of VISILIENCE.

**References**