Attack Graph Generation for Micro-service Architecture

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***Abstract*—**

I. INTRODUCTION

II. RELATED WORK

III. ARCHITECTURE

1) Breadth-first search: We use a modification of the breadth first search algorithm to find the nodes and the edges.

```
Data: goal_container, topology,
      container_exploitability
Result: nodes, edges
nodes, edges, queue, passed_nodes = list(), dict{},
 Queue(), [];
queue.put(goal_container);
nodes = get_nodes();
while ! queue.isEmpty() do
    ending_node = queue.get();
    passed_nodes[ending_node] = True;
    cont_exp_end =
     container_exploitability[ending_node];
    neighbours = topology[ending_node];
    for neighbour in neighbours do
        if neighbour == "outside" then
            edges.append(create_edges());
            continue;
        end
        if ! passed_nodes[neighbour] then
            queue.put(neighbour);
        end
        if neighbour == goal_container then
            continue;
        end
        edges.append(create_edges())
    end
end
```

Algorithm 1: Breadth-first search algorithm for generating an attack graph.

The algorithm requires the goal container, the topology and a dictionary of the exploitable vulnerabilities as an input and the output is made up of the nodes and the edges that make the attack graph. The algorithm first initializes the nodes, edges, queue and the passed nodes. Afterwards it generates the nodes which are a combination of the image name and the exploitable vulnerability. Then into a while loop we iterate through every node, check its neighbours and add the edges. If the neighbour was not passed, then we add it to the queue. The algorithm terminates when the queue is empty.

IV. EXPERIMENTS

V. CONCLUSION

ACKNOWLEDGMENT

REFERENCES

[1] Merkel, Dirk. "Docker: lightweight linux containers for consistent development and deployment." Linux Journal 2014.239 (2014): 2.