



# GOTTA CATCH 'EM ALL: AGGREGATING CVSS SCORES



WHERE  
TECHNOLOGY  
IS AN ATTITUDE

This is me



# Hello!

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& TECHNOLOGY ALLIANCE

- 1. INTRODUCTION**
- 2. Literature Review**
- 3. PROPOSAL**
- 4. Conclusions and future work**

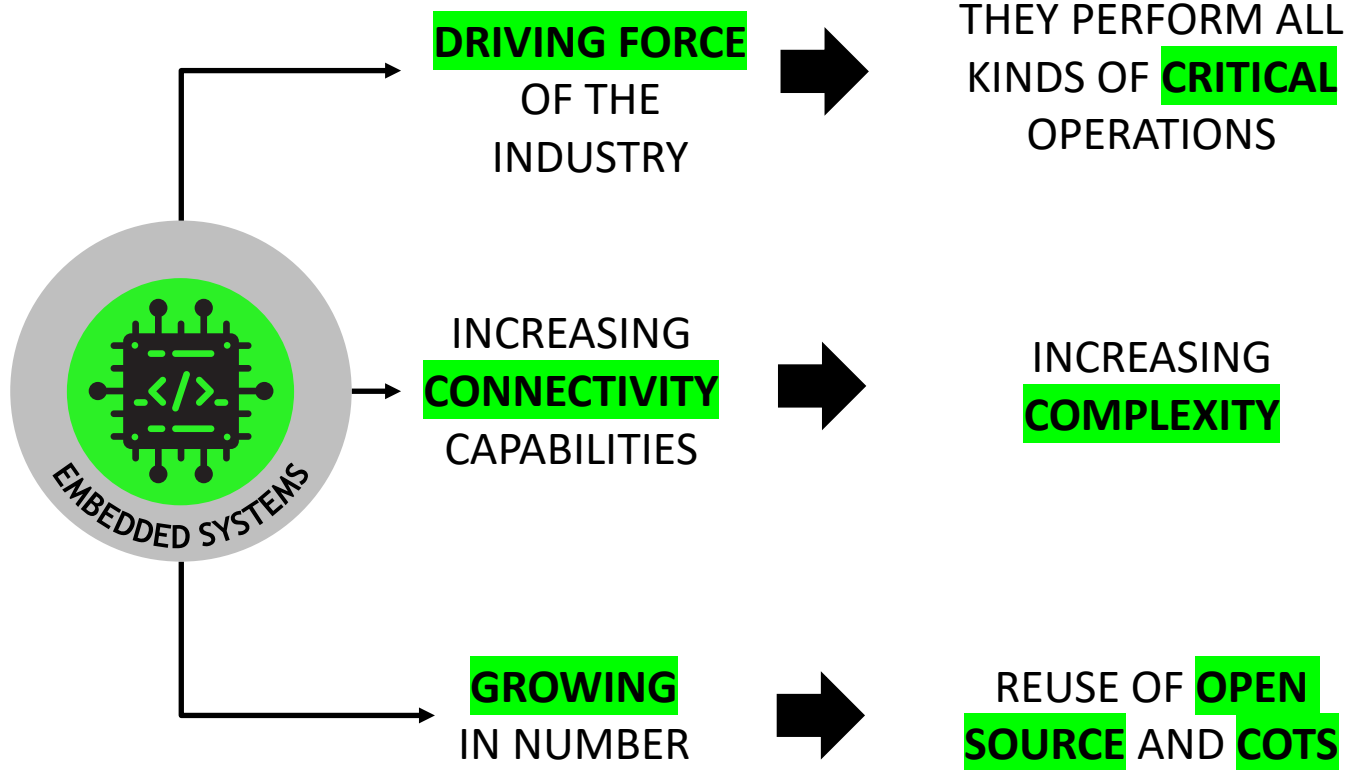
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# Context and Problem

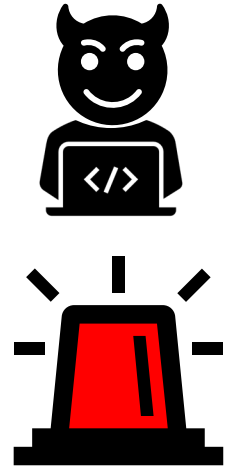




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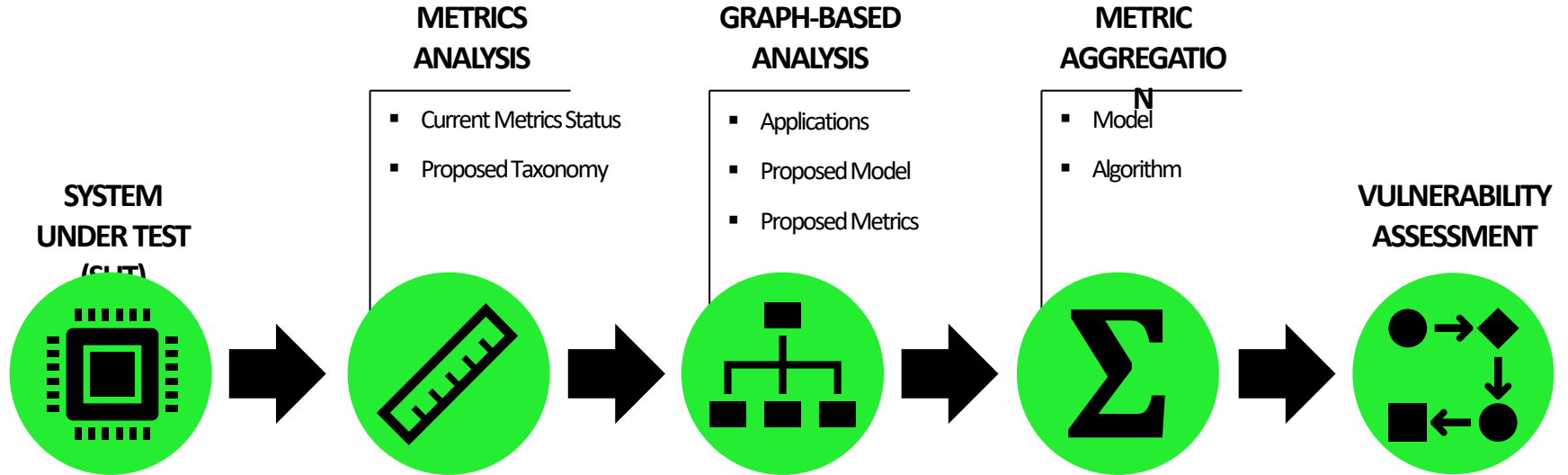


# Introduction





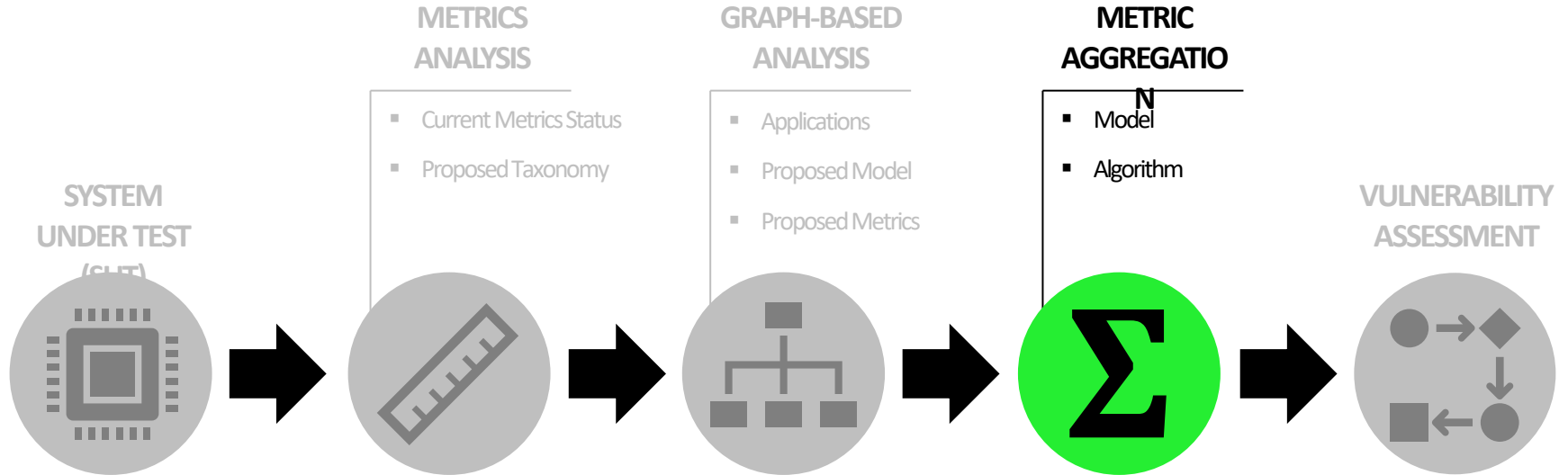
HOW CAN WE KNOW IF AN  
ES IS **SECURE ENOUGH?**





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# Proposal







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# State of the Art

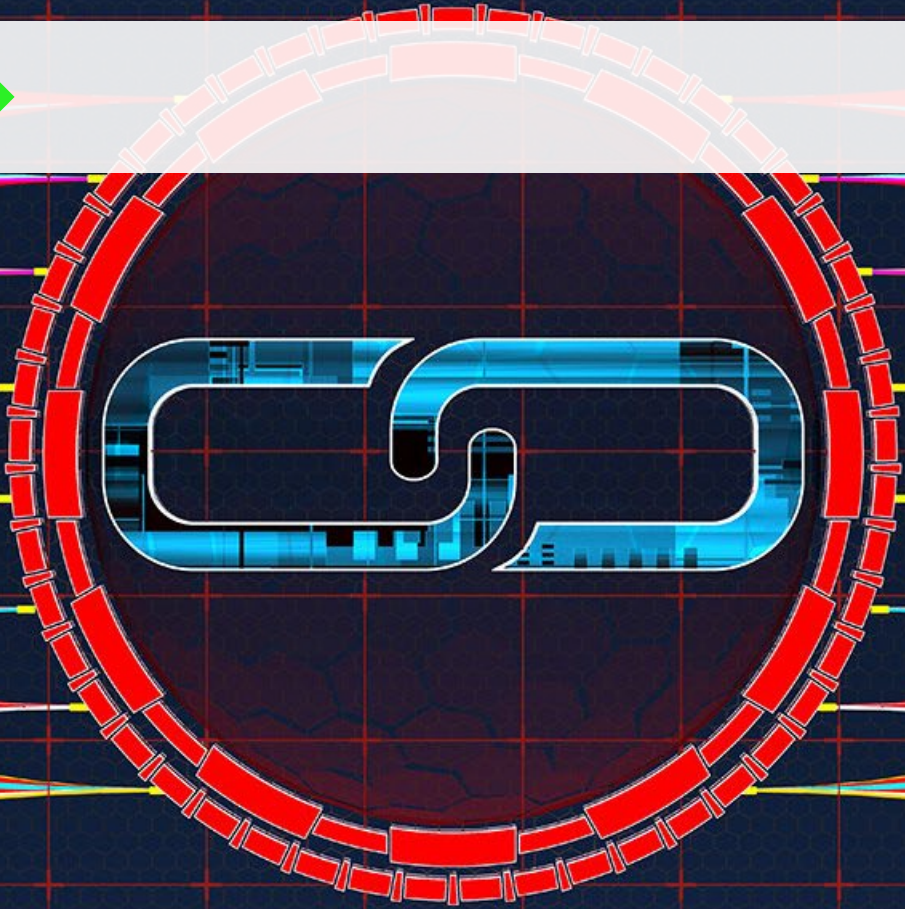




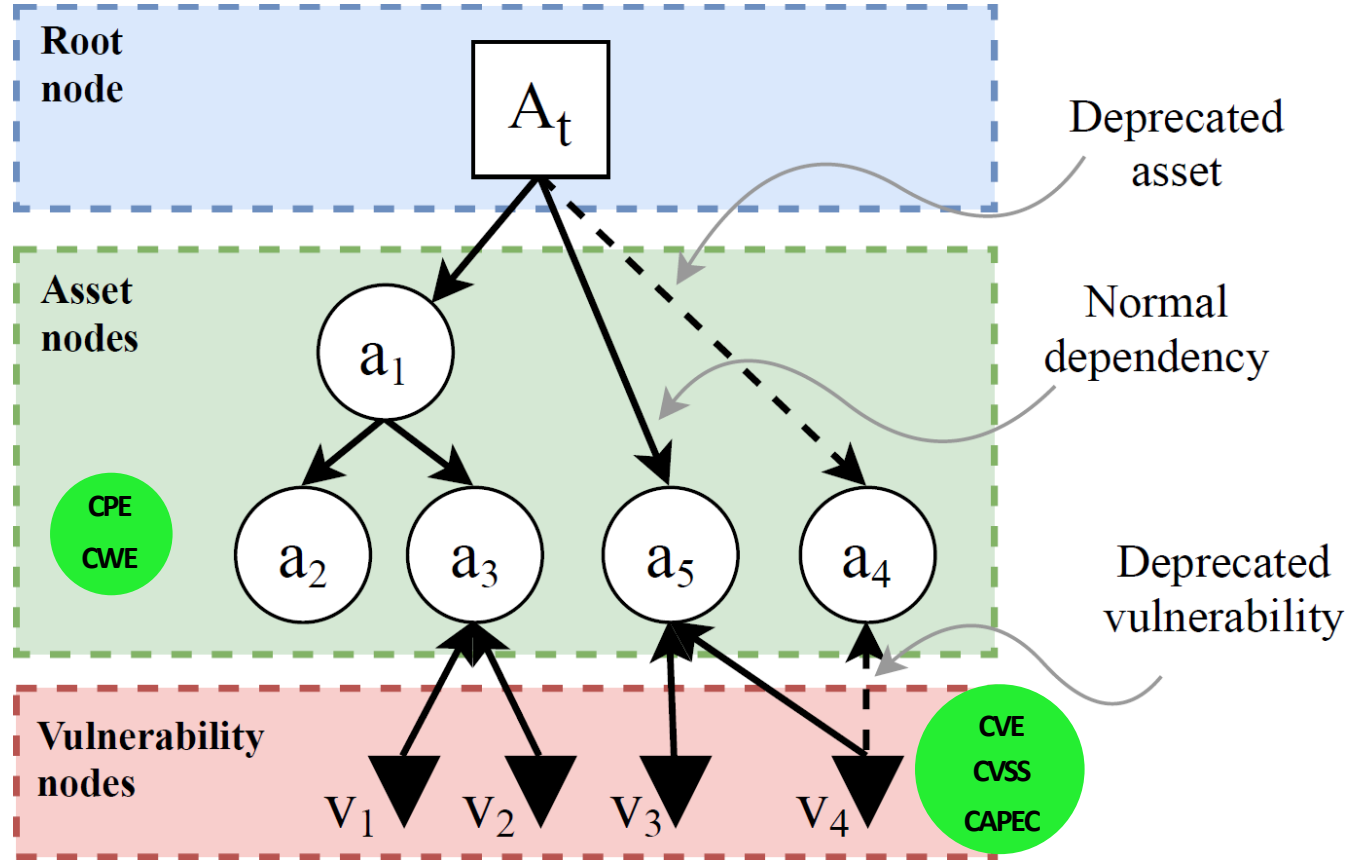
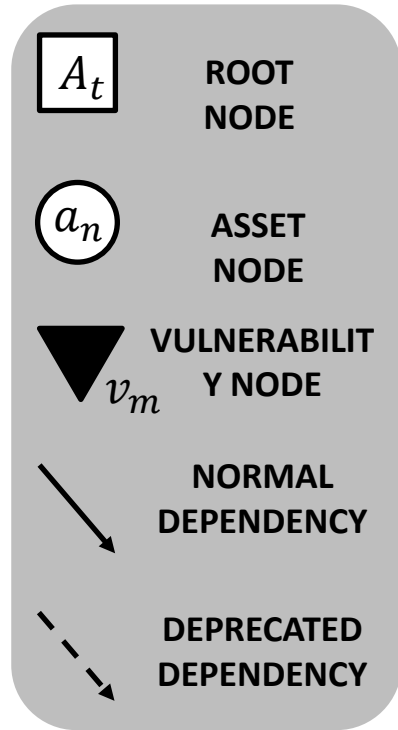
# Results of the Literature Review



- **LACK OF CONSENSUS** and standardization of CVSS aggregation
- **CVSS DOES NOT PROPOSE** any kind of aggregation mechanism
- **THREE MAIN TYPES:**
  - Arithmetic Aggregation
  - Attack Graph-based Aggregation
  - Bayesian Network-based Aggregation
- **CONTEXT** is not considered



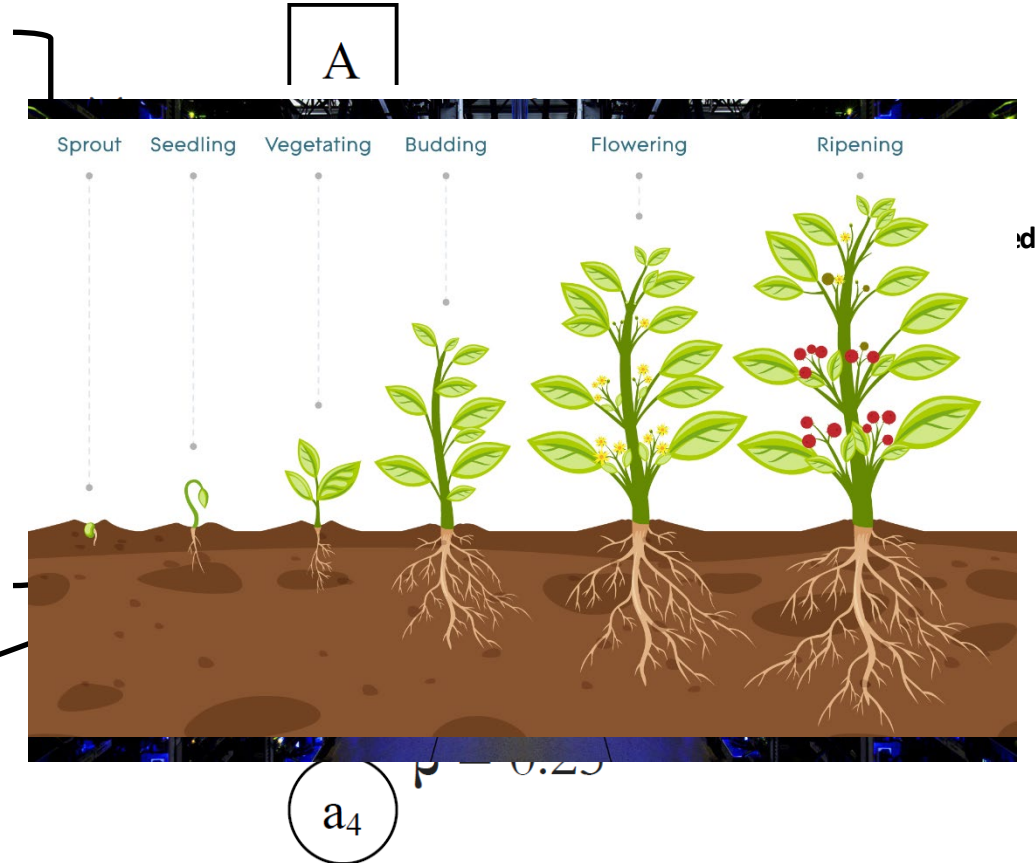
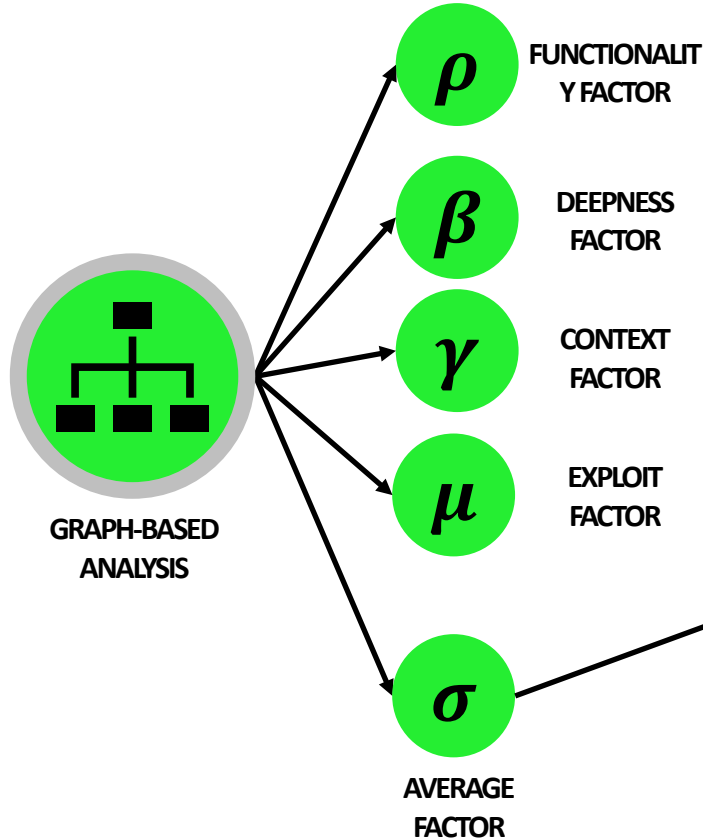
# Conditions to Apply the Algorithm





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# Metric Aggregation





# Metric Aggregation

$$a = 1 - (1 - b)(1 - c)$$
$$cvSS_{total} = 1 - (1 - \rho_a \beta_a \gamma_a \mu_a cvSS_a)(1 - \rho_b \beta_b \gamma_b \mu_b cvSS_b)$$
$$cvSS_{total} = 1 - (1 - \lambda_a cvSS_a)(1 - \lambda_b cvSS_b)$$

$$cvSS_{total} = 10 \left[ 1 - \left( 1 - \frac{\lambda_a}{10} cvSS_a \right) \left( 1 - \frac{\lambda_b}{10} cvSS_b \right) \right]$$

$$a_n = 10 \left[ 1 - \left( 1 - \frac{\lambda_{a_{n-1}}}{10} a_{n-1} \right) \left( 1 - \frac{\lambda_{cvSS_n}}{10} cvSS_n \right) \right]$$



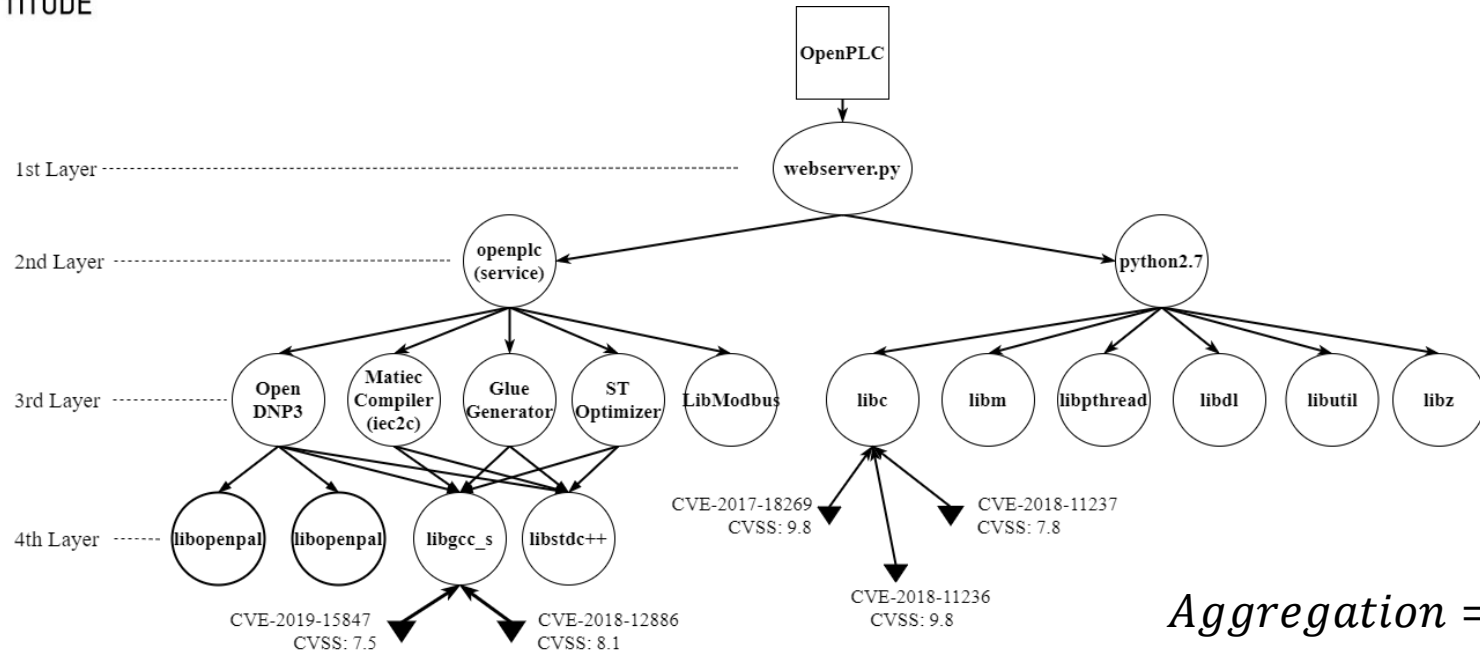
# Metric Aggregation

$$f(\vec{V}) = \begin{cases} a_n = 10 \left[ 1 - \left( 1 - \frac{\lambda_{a_{n-1}}}{10} a_{n-1} \right) \left( 1 - \frac{\lambda_{cvss_n}}{10} cvss_n \right) \right] \\ a_0 = \lambda_{cvss_0} cvss_0 \end{cases}$$

$$\Gamma(\vec{V}) = 10 - \frac{1}{\sigma} f(\vec{V})$$



# Metric Aggregation



CVE
CVE-2017-18269
CVE-2018-11236
CVE-2018-11237
CVE-2018-12886
CVE-2019-15847

*Aggregation = 9,1*

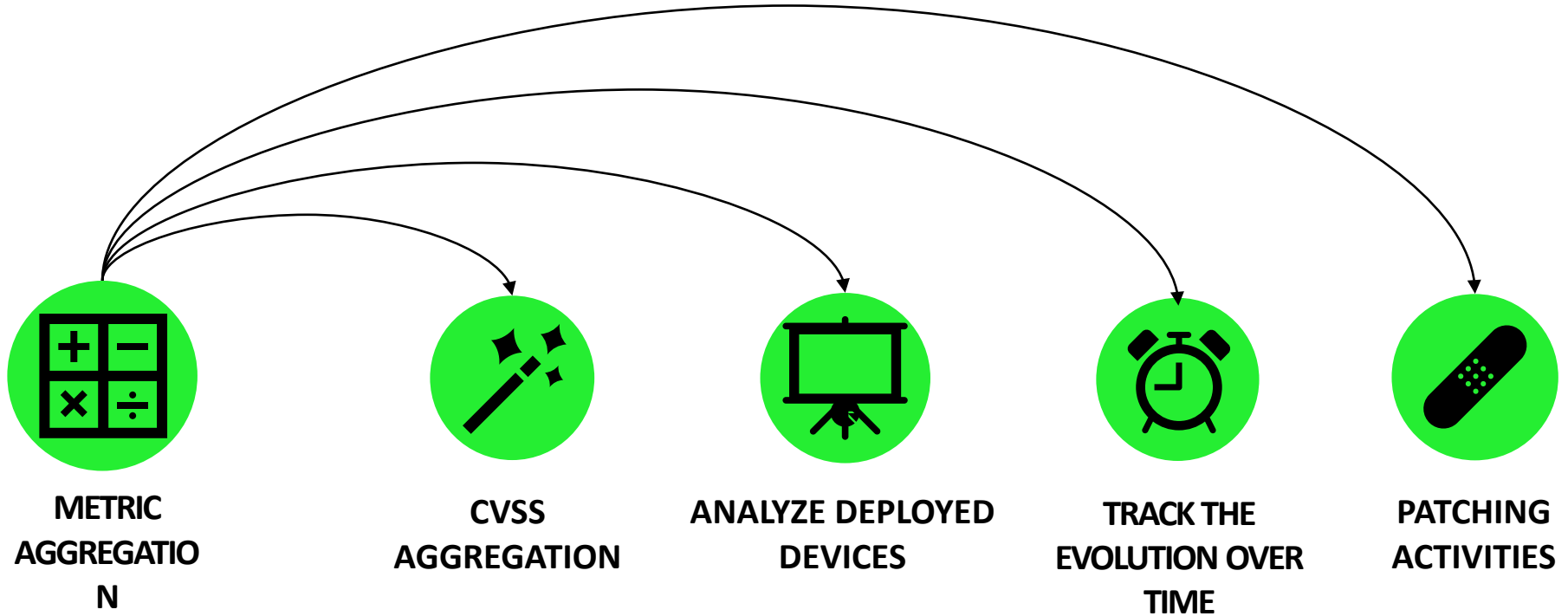


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# Conclusions





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# Future Work





- 1) MORE EXTENDED **METRICS IN THE INDUSTRY**.
- 2) ANALYZE THE **GENERALIZATION** OF THE AGGREGATION WITH OTHER METRICS.
- 3) DEVELOP A TOOL TO **AUTOMATE** THE AGGREGATION.
- 4) **AGGREGATION AT SUBMETRIC** LEVEL.

THANK YOU

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