Skeletons with Autonomic Behaviour

in Skandium

Our Team

- Ludovic Henrio - Inria France
- Cristian Ruz - Inria France
- Mario Leyton - Google
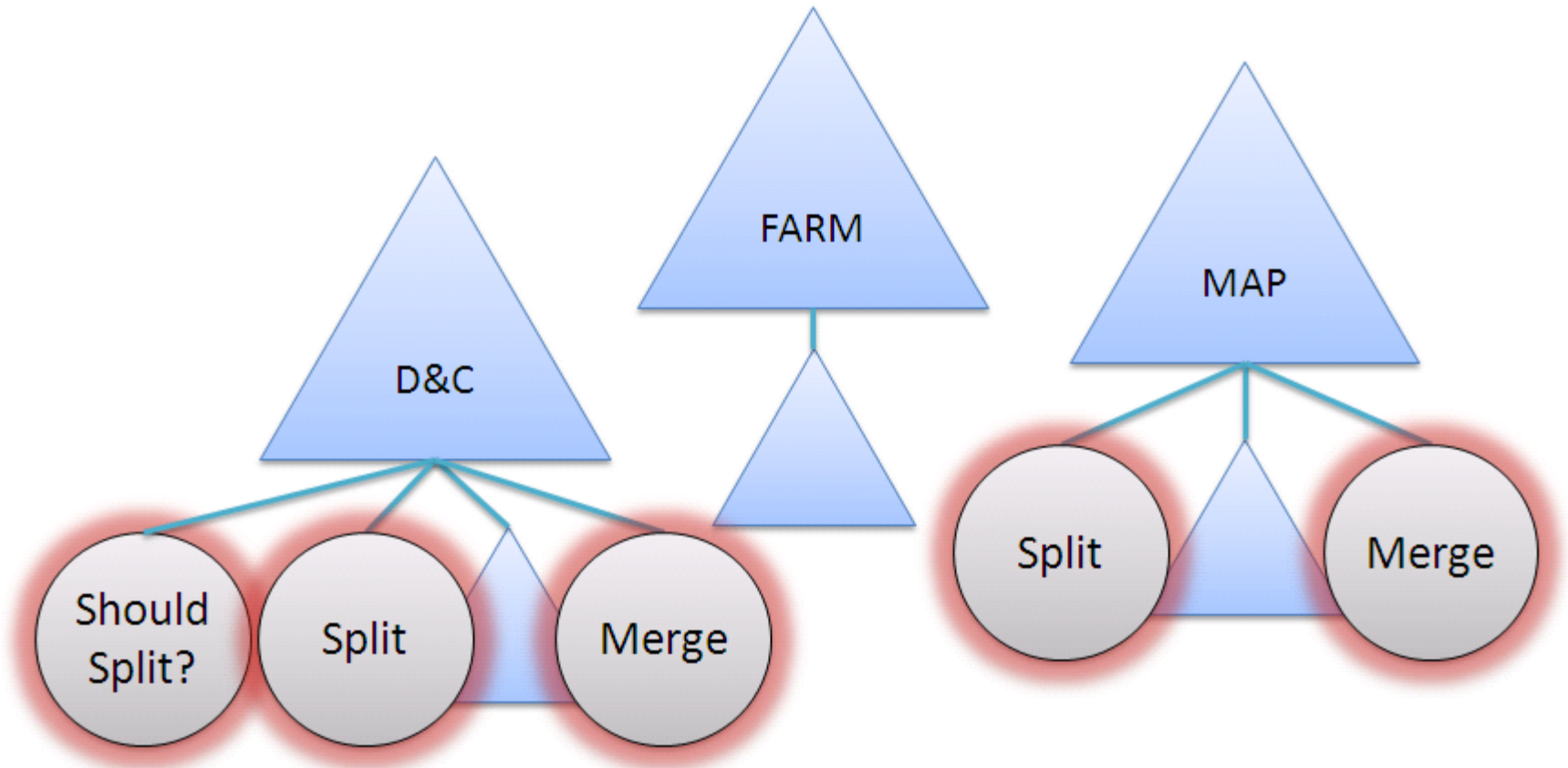- Gustavo Pabón - NIC Labs / IBM Chile

This Presentation

1. Skeletons
2. Skeletons with Autonomic Behaviour
3. Skeletons with Autonomic Behaviour in Skandium
4. How we do it? - Event's Support
5. How we do it? - Muscle Scheduling
6. How we do it? - Estimations
7. We are not alone - Related Work
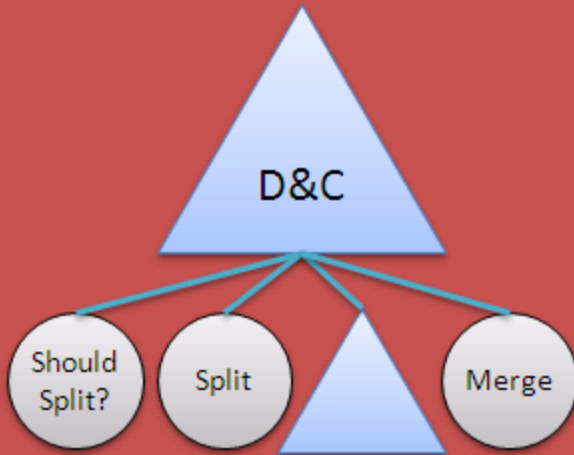8. What's next?

Skeletons
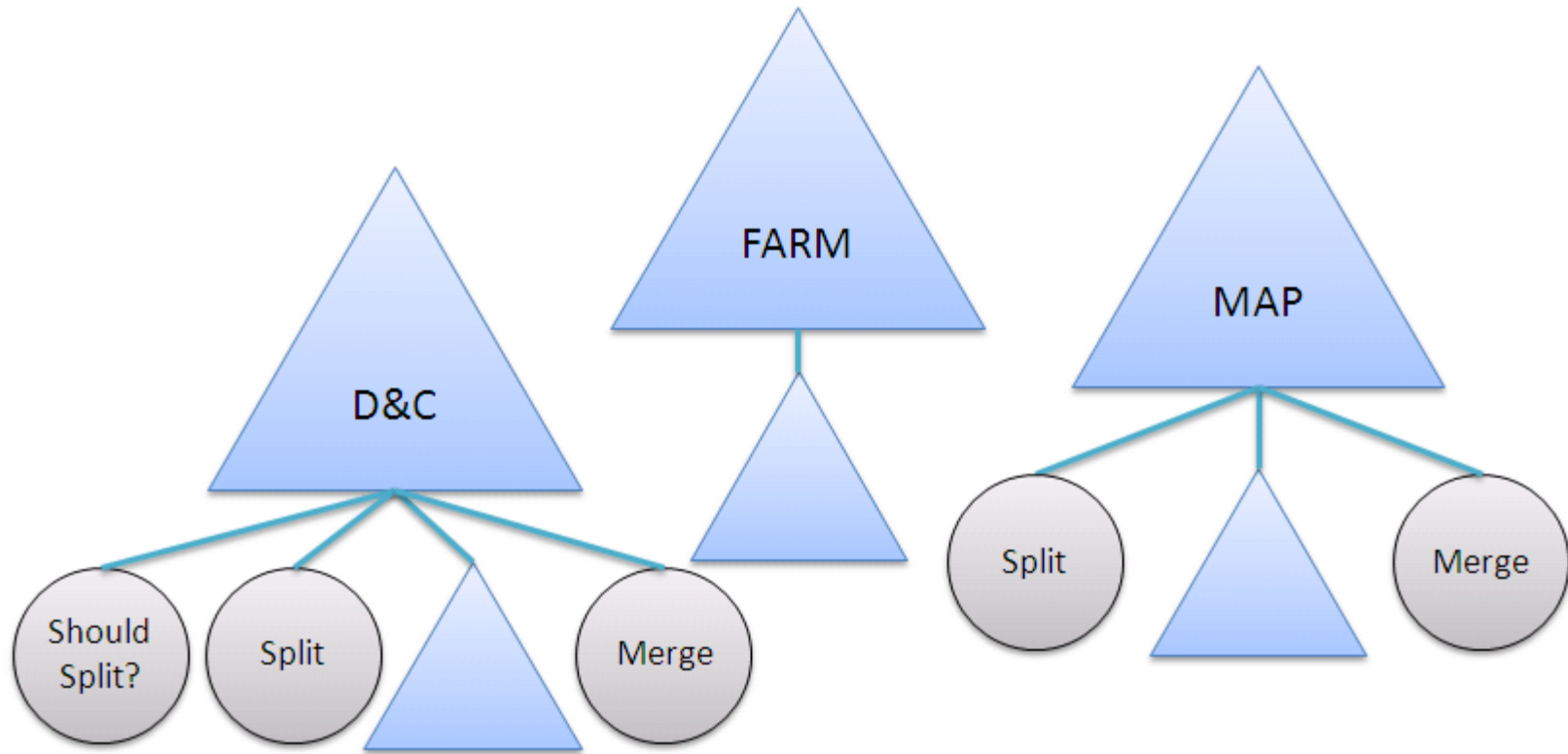
Skeletons

Skeletons with Autonomic Behaviour

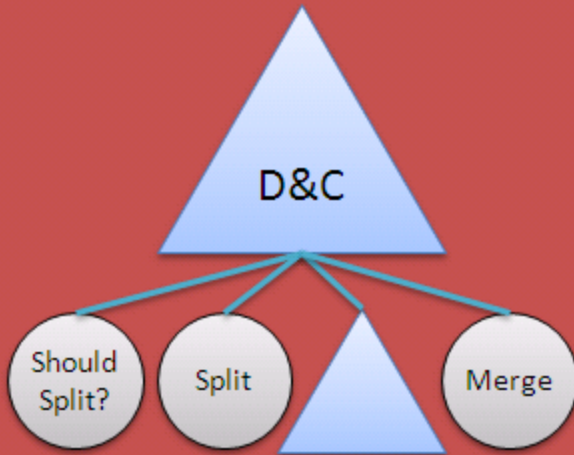GOAL: Solve the problem in 90s
Elapsed time: 20s

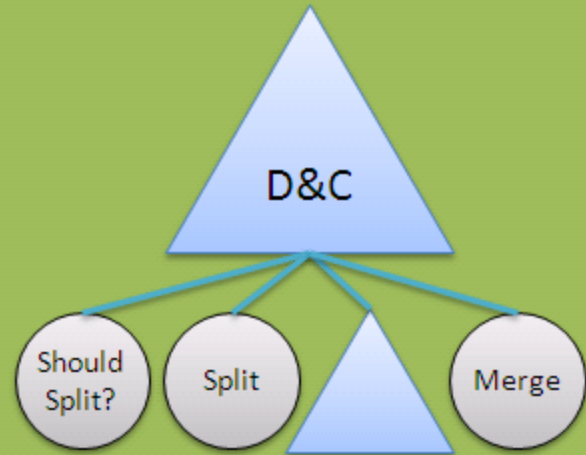Number of Threads: 2
Estimated time until finished: 100s

D&C

Should Split?   Split   Merge

Skeletons with Autonomic Behaviour

Skeletons with Autonomic Behaviour in Skandium
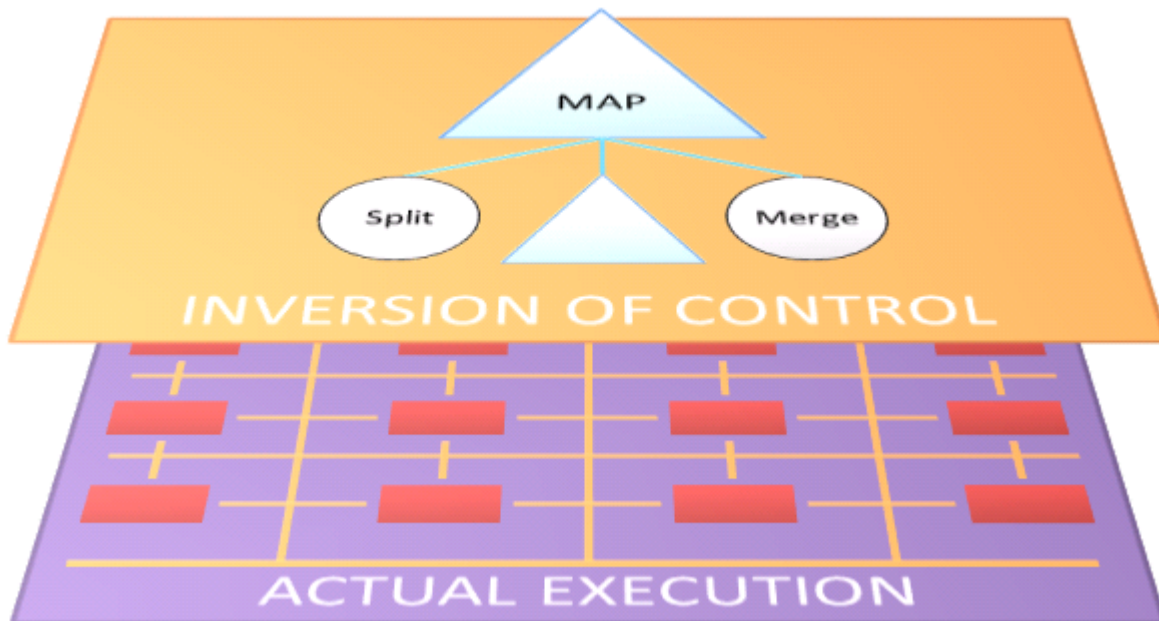
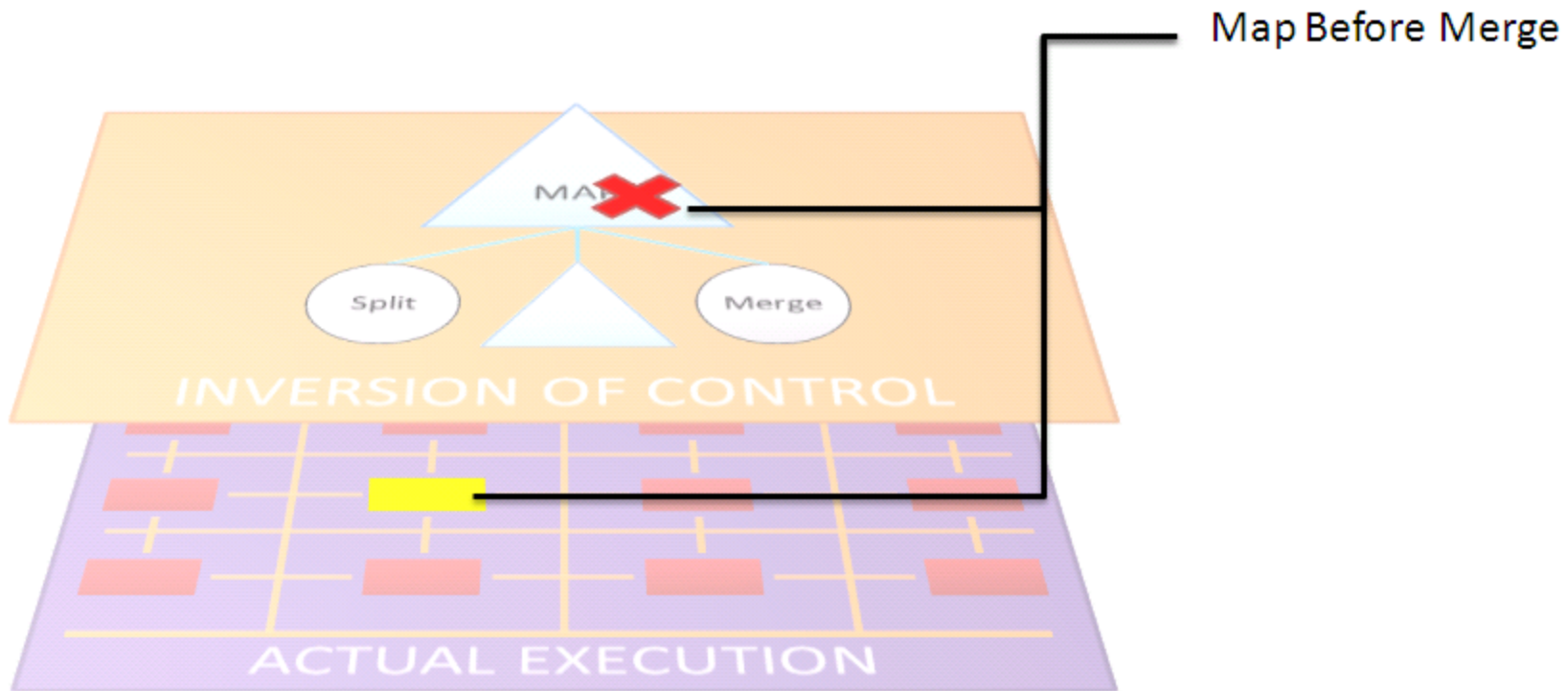| GOAL	Default value
Maximum memory consumption (yellow)	60 %
Maximum memory consumption (red)	80 %
Maximum number of threads per core	2
Wall clock execution time	Minimum possible

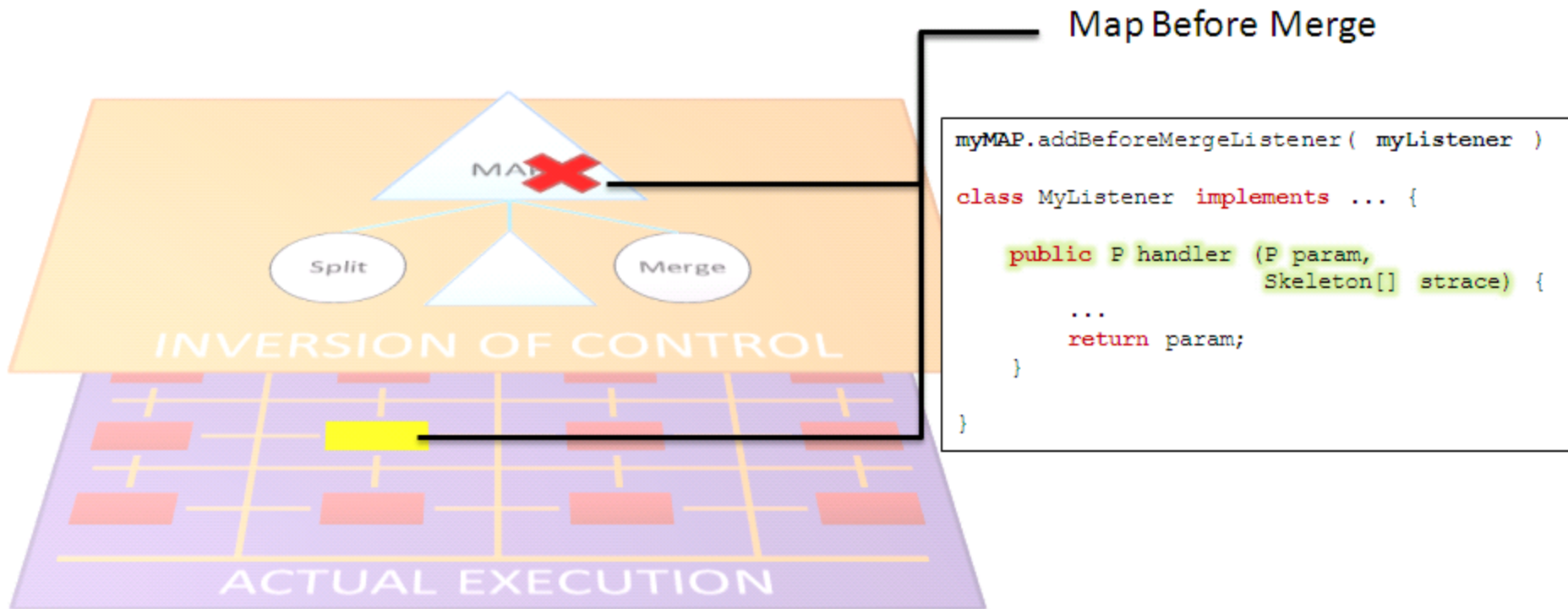| Parameter	Default value
ρ – Estimation parameter	0.5

# How we do it? - Event's Support

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How we do it? - Event's Support

Map Before Merge

```
myMAP.addBeforeMergeListener( myListener )

class MyListener implements ... {

    public P handler (P param,
                       Skeleton[] strace) {
        ...
        return param;
    }

}
```
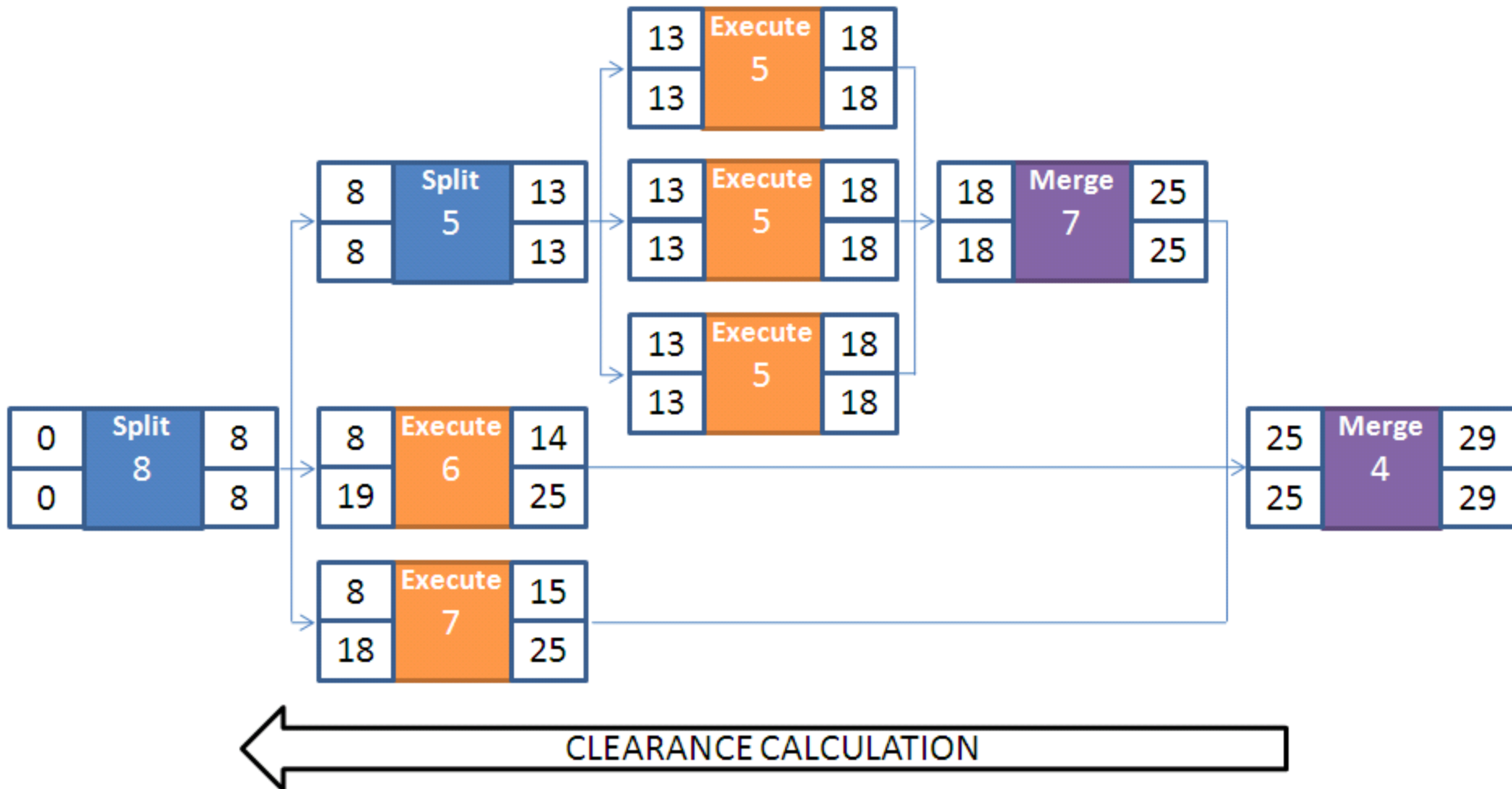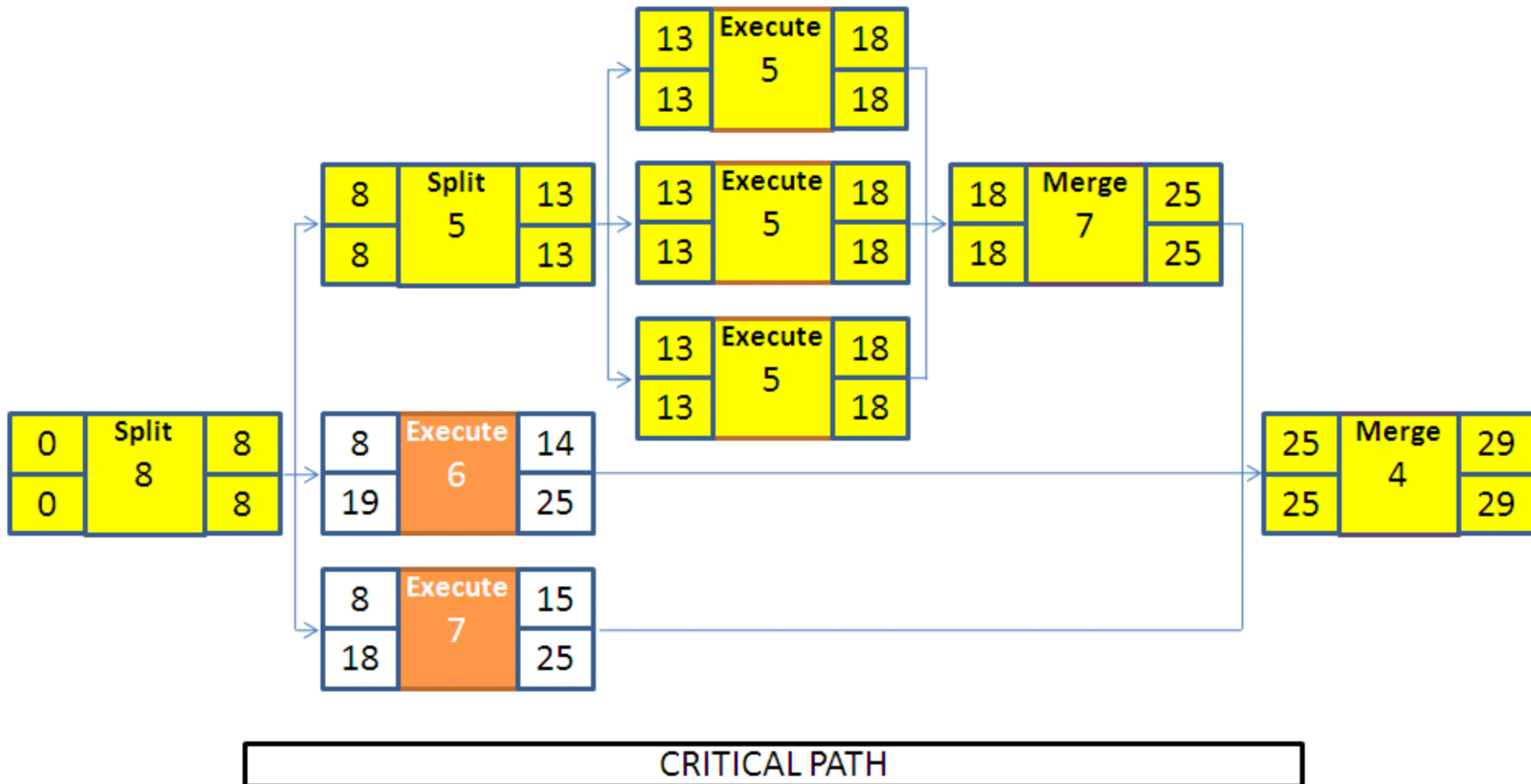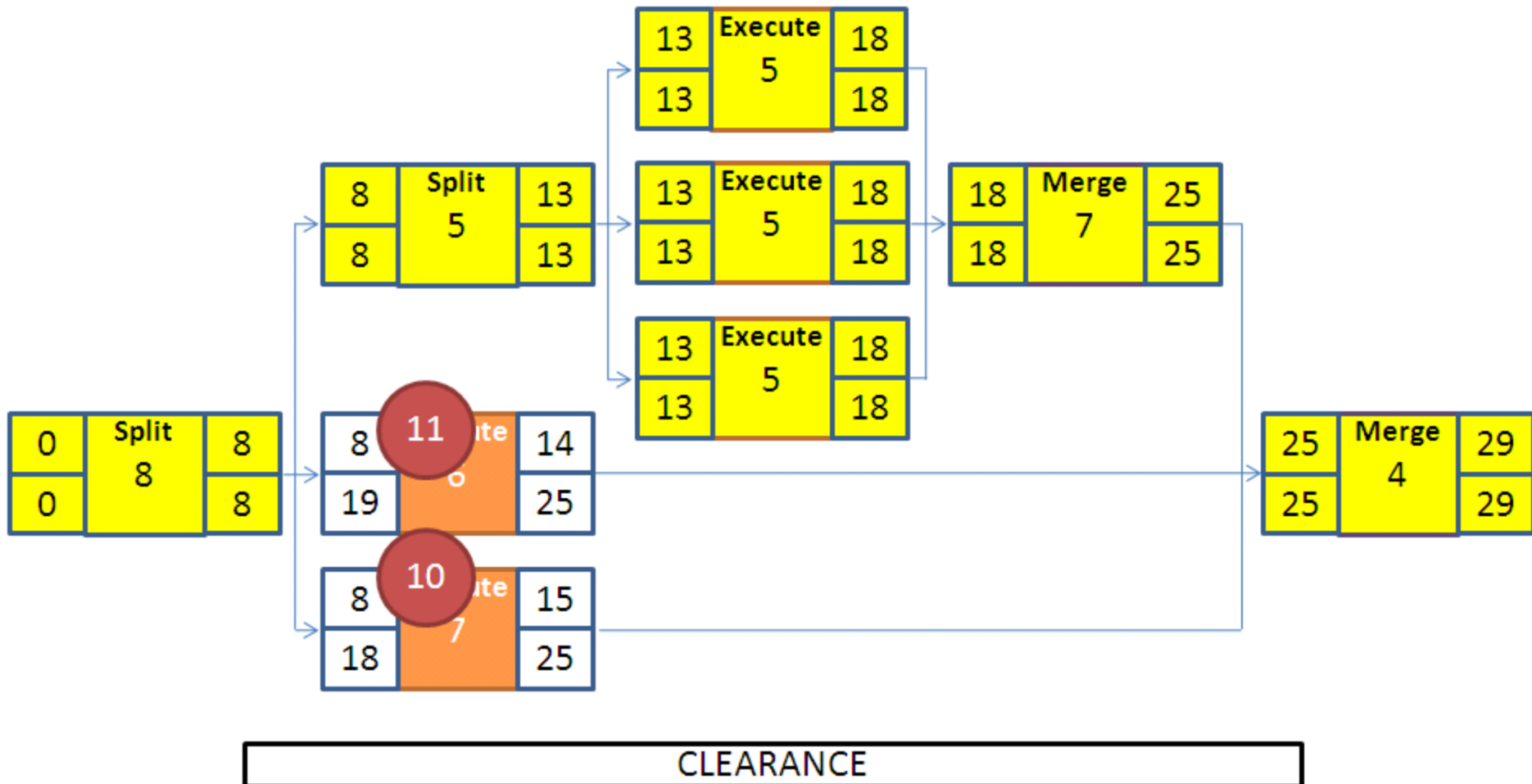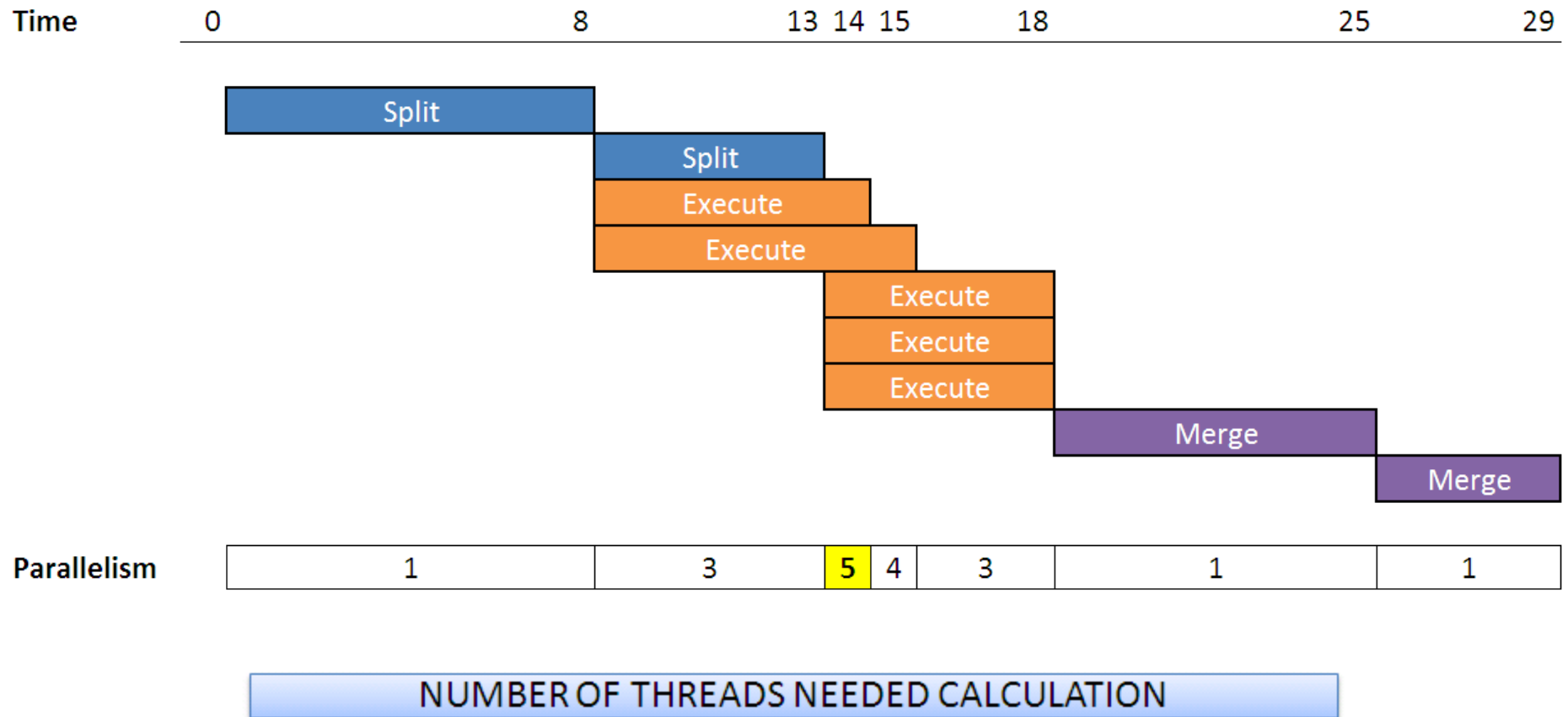
How we do it? - Muscle Scheduling

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CRITICAL PATH

How we do it? - Muscle Scheduling

How we do it? - Muscle Scheduling

NUMBER OF THREADS NEEDED CALCULATION
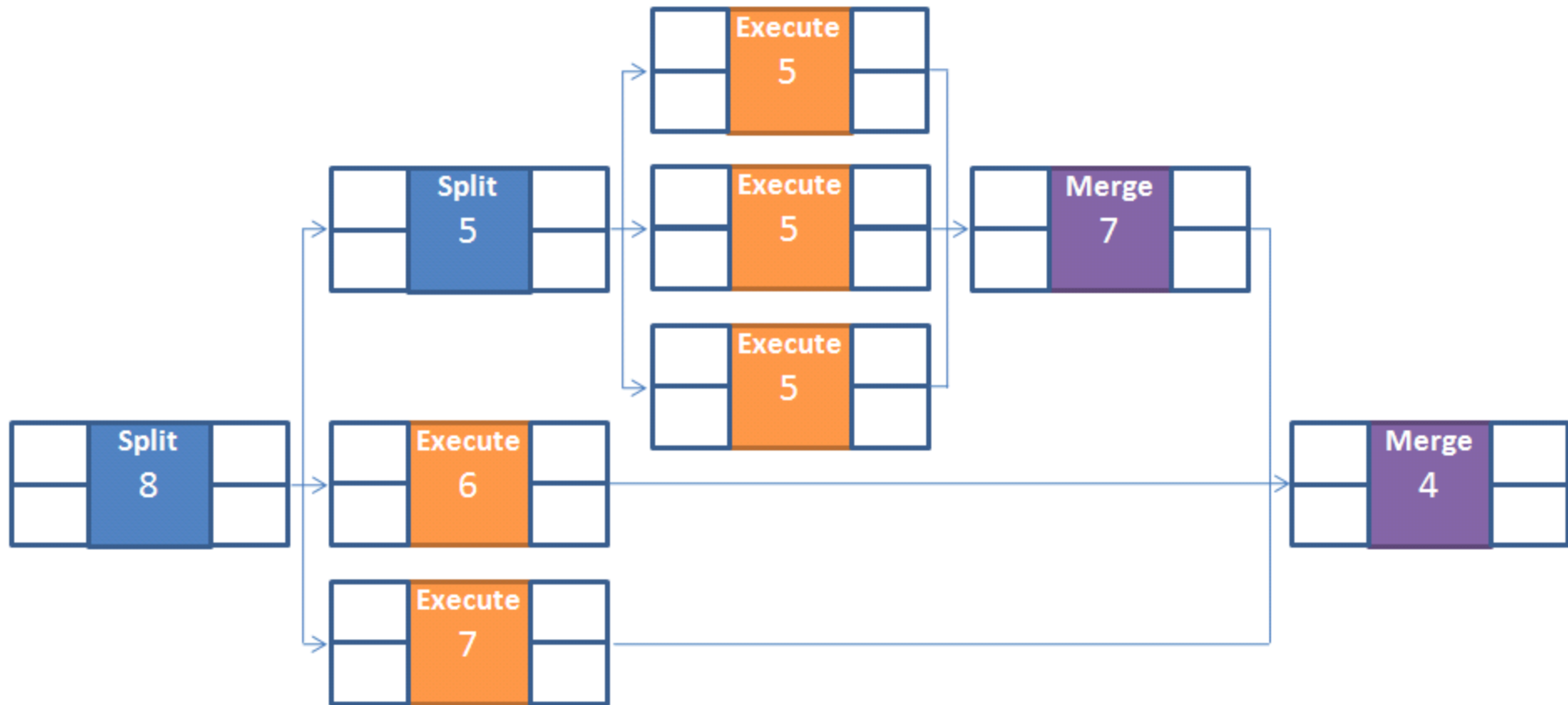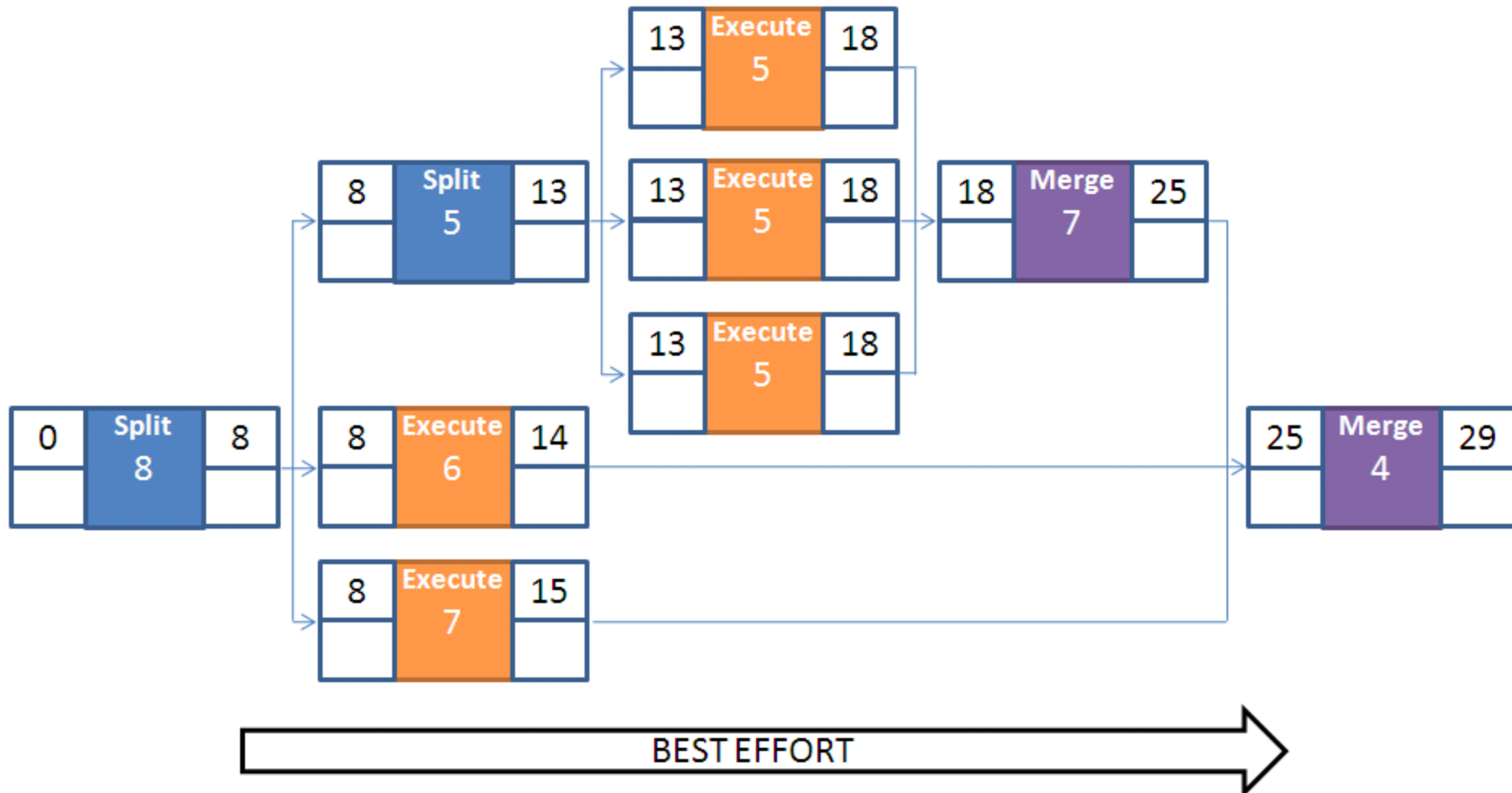
How we do it? - Muscle Scheduling
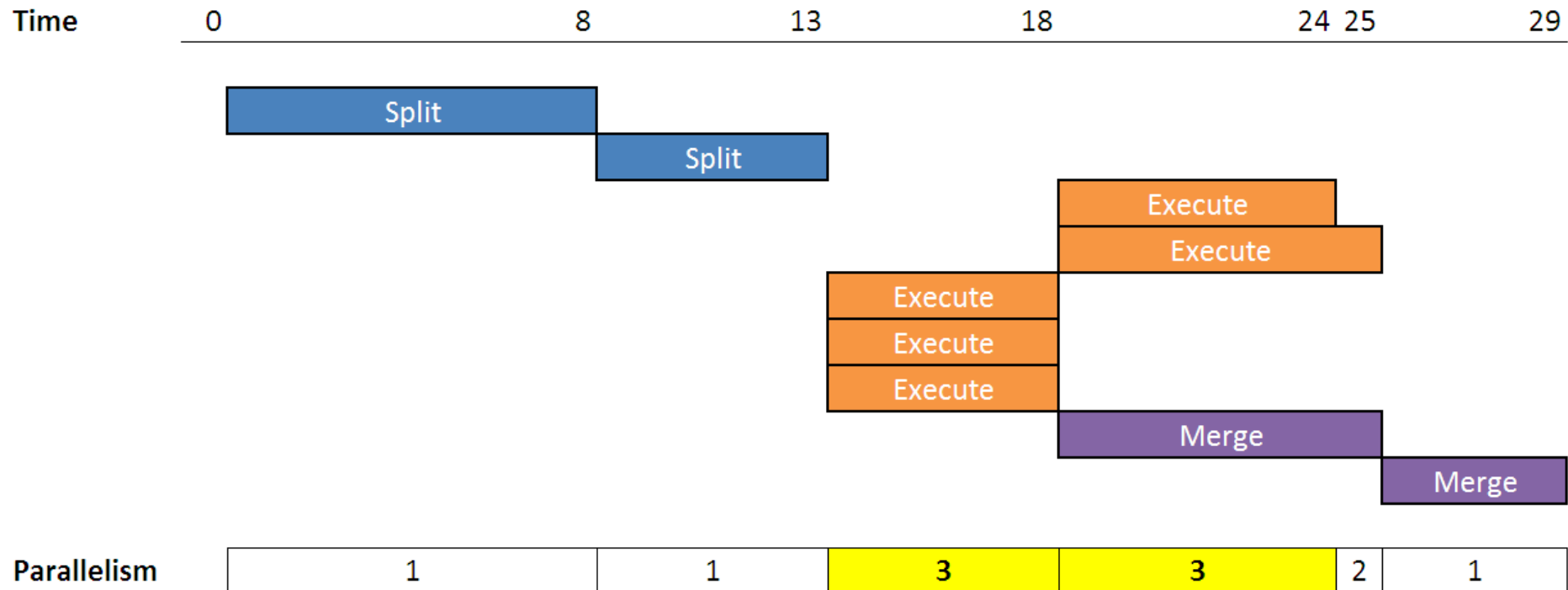
How we do it? - Estimations

Parameters to estimate
Muscle execution time
Array size after a split execution
¿How many times a condition will return true?

$$EstimatedValue = \boldsymbol{\rho} \times LastActualValue + (1 - \boldsymbol{\rho}) \times LastEstimatedValue$$

Default value: $\boldsymbol{\rho} = 0.5$

We are not alone - Related Work

2007 - Behavioural Skeletons. M. Aldinucci, et al.

2008 - Behavioural Skeletons in GCM. M. Aldinucci, et al.

2008 - Behavioural Skeletons Meeting Services. M Danelutto, et al.

2009 - Autonomic Management of Multiple Non-Functional Concerns. M. Aldinucci, et al.

2009 - Co-design of Distributed Systems Using Skeleton and Autonomic Management Abstractions. M. Adinucci et al.

What's Next?

- Finish development
- Test plan/execution
- Reinforce Related Work and Contribution
- Write paper

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in Skandium