

DEFECT DETECTION IN A DISTRIBUTED SOFTWARE MAINTENANCE PROJECT

Alessandro Bianchi, Danilo Caivano, Filippo Lanubile,
Giuseppe Visaggio

SER_Lab - Department of Informatics - University of Bari
{bianchi, caivano, lanubile, visaggio}@di.uniba.it

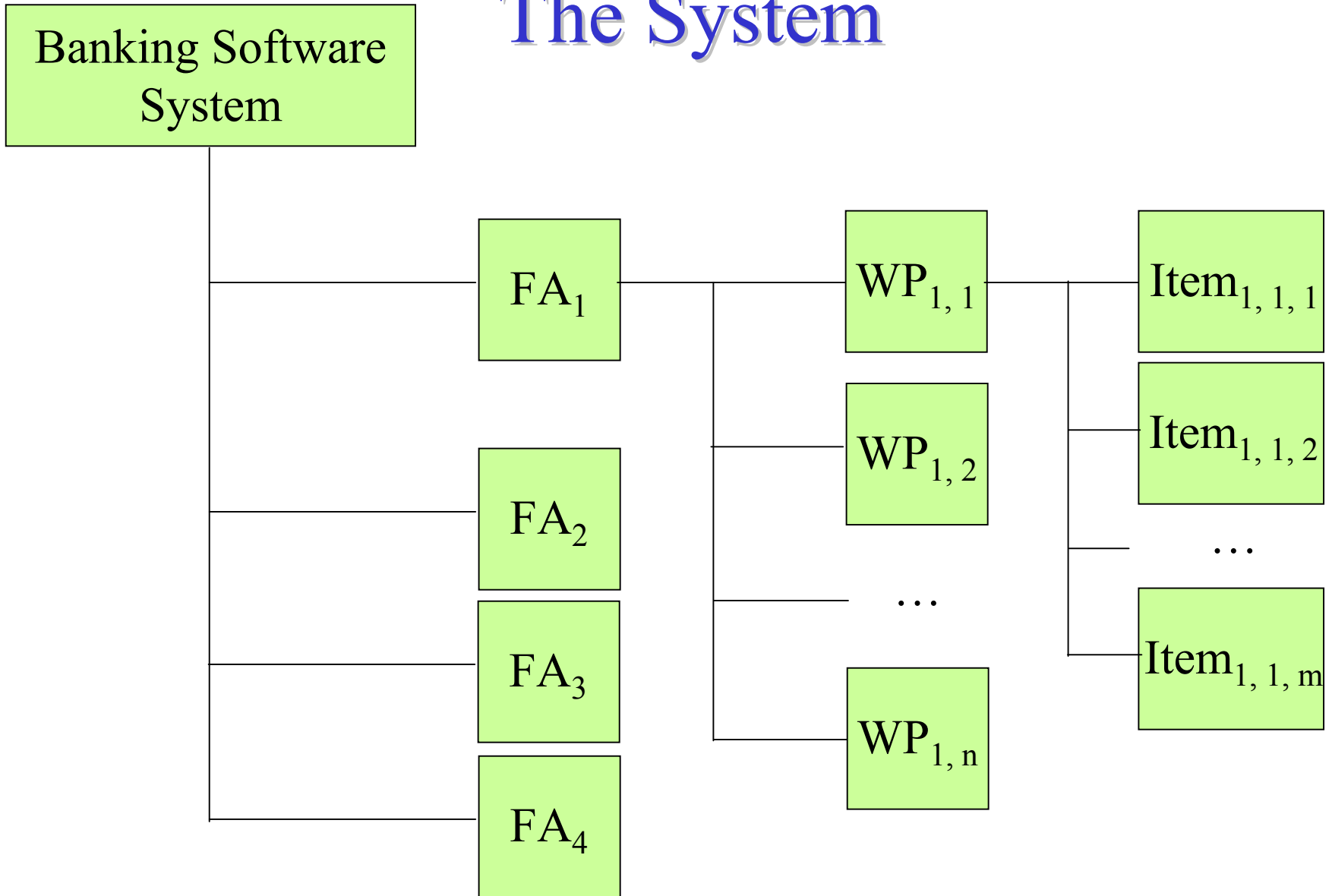


Case Study

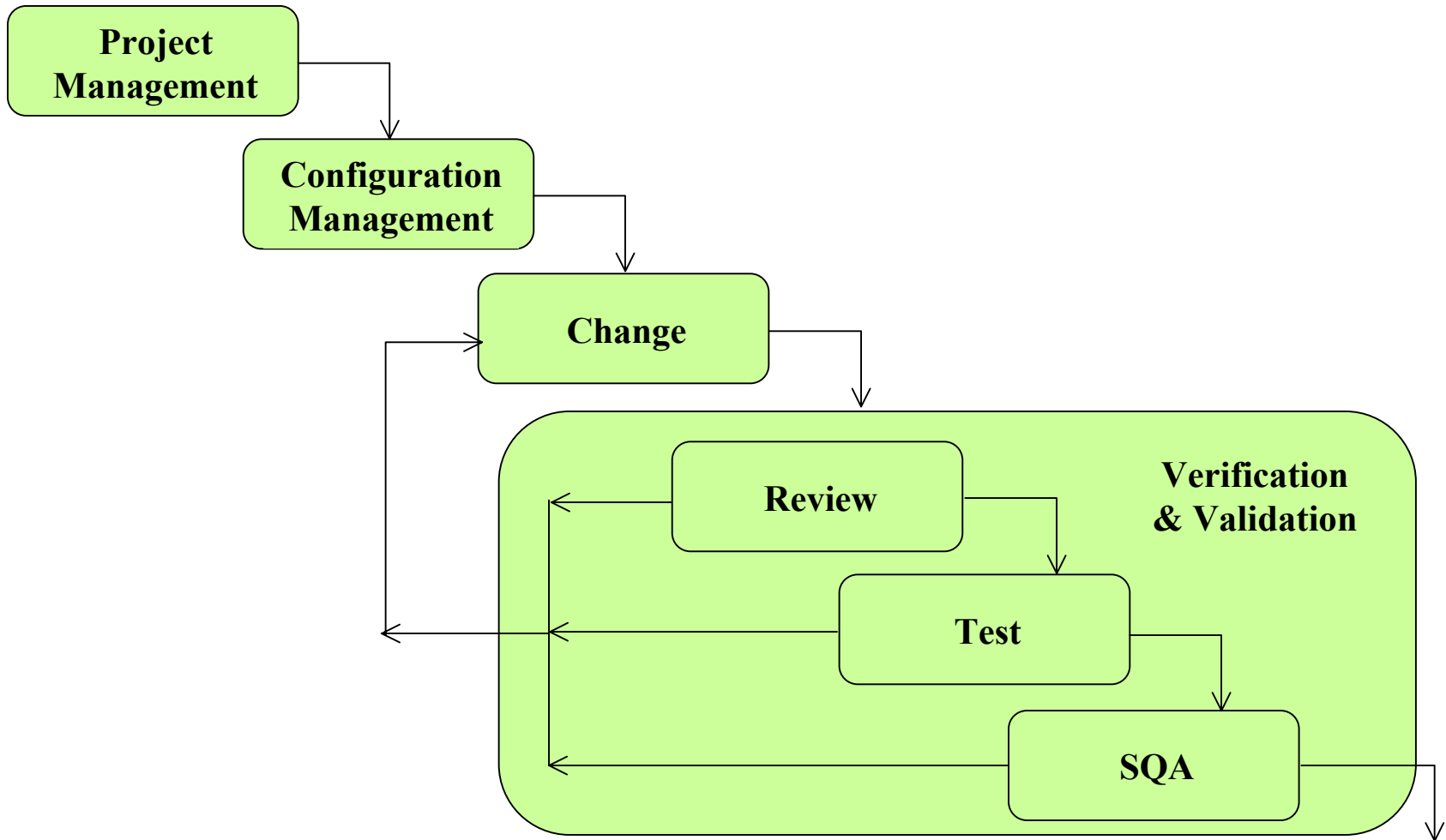
- ⇒ Post mortem analysis on a maintenance project carried out in EDS Italia
- ⇒ Massive maintenance
 - of a large banking software system
 - to solve the Y2K problem



The System



The Maintenance Process ...



... The Maintenance Process

- ⇒ Process execution started on **Site 1** for all WPs
- ⇒ Depending on rework needs and currently available resources, Change and V&V phases were switched for some WPs to **Site 2**
- ⇒ Both sites were settled in Italy
- ⇒ The **Collocated project** includes WPs entirely executed at Site 1
- ⇒ The **Distributed project** includes WPs executed at both Site 1 and Site 2



Previous Results*

- ⇒ There are not statistically significant differences between collocated and distributed projects for
 - Duration
 - Effort
 - Staff
 - Reworking cycles
- ⇒ There are statistically significant differences between collocated and distributed projects for
 - Number of reports
 - Number of meetings

* A. Bianchi, D. Caivano, F. Lanubile, F. Rago, G. Visaggio, “An Empirical Study of Distributed Software Maintenance”, *Proc. of the IEEE Intl. Conf on Sw Maint.*, 2002



Further Analysis: Defect Metrics

- ⇒ Research Question: Does the distribution among sites affect defect metrics?
- ⇒ Therefore, for each defect metric M_i the following are posed
 - H_{i0} : There is no difference between the values of defect metric M_i for collocated WPs and for distributed WPs
 - $H_{i\alpha}$: There is a difference between the values of defect metric M_i for collocated WPs and for distributed WPs

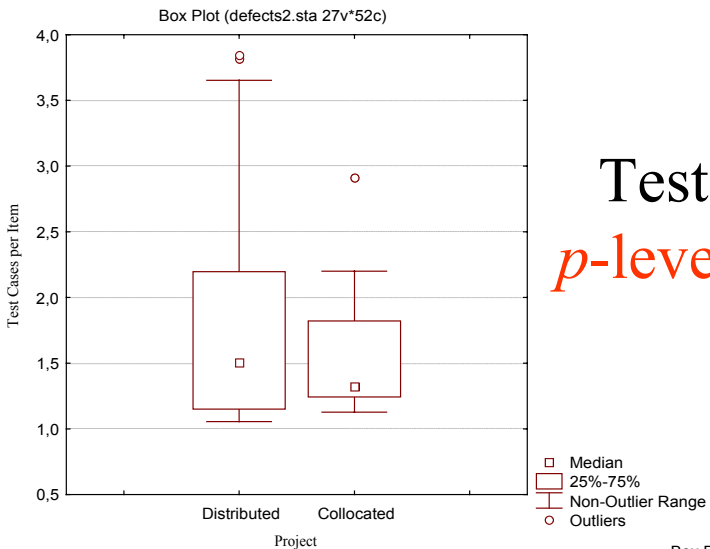


Observed metrics

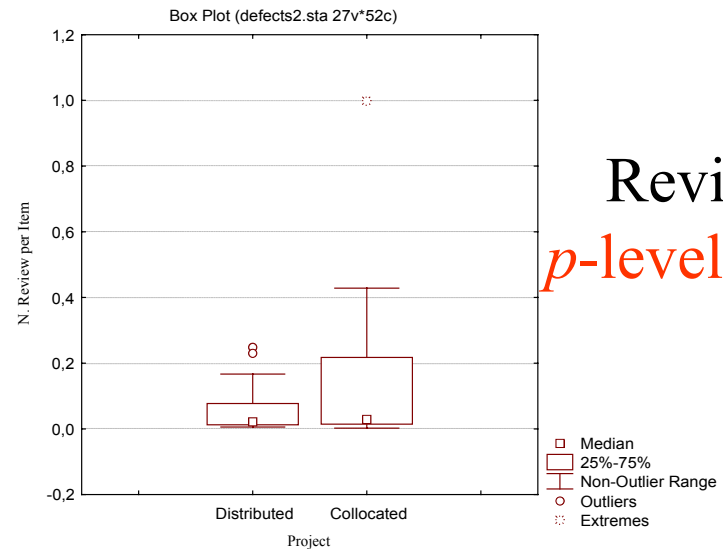
- ⇒ # executed test cases & # of faults that caused failures (*faults from testing*)
- ⇒ # reviews & # of found defects (*faults from review*)
- ⇒ # audits & # of found issues (*non conformities from audits*)
- ⇒ WPs Size (# items)



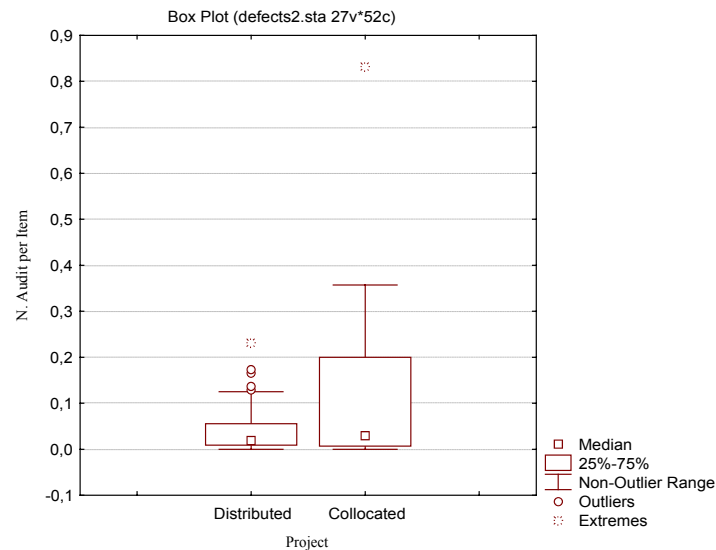
Results ...



Test Cases
 $p\text{-level}=0.633$



Reviews:
 $p\text{-level}=0.359$



Audits:
 $p\text{-level}=0.453$

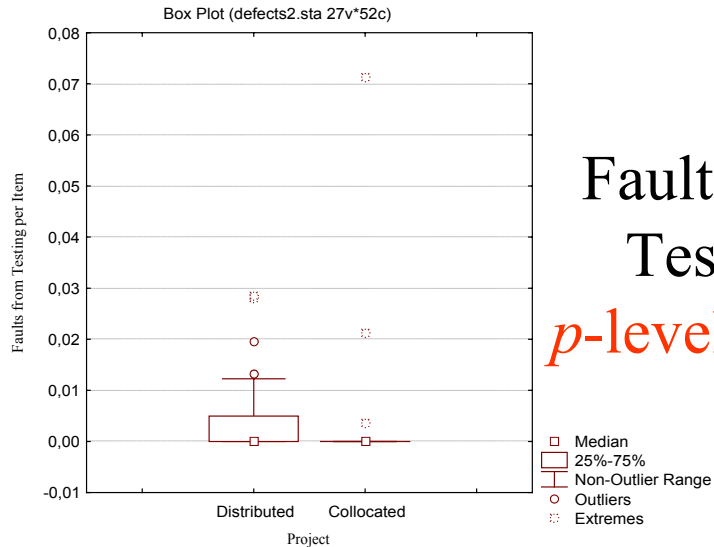


DIB

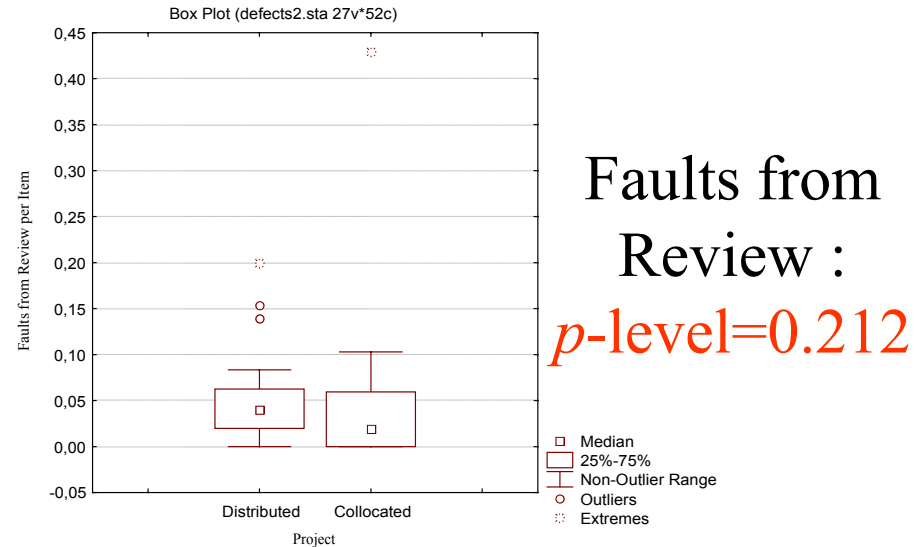
V&V activities **are comparable**

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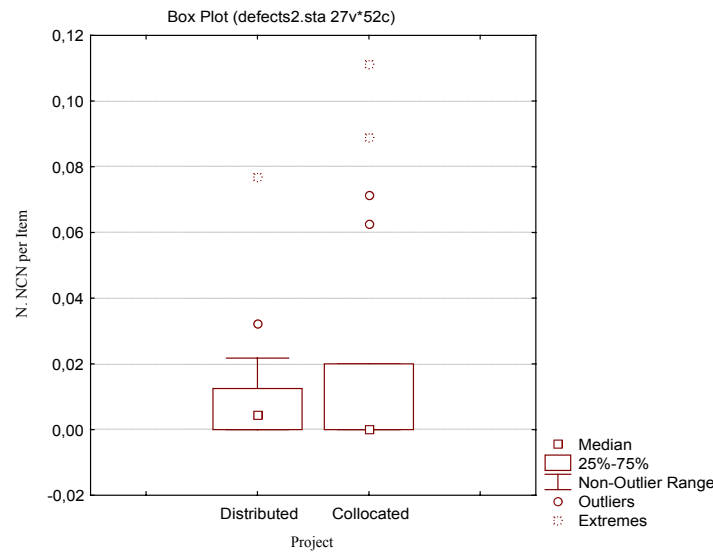
...Results



Faults from
Testing:
 $p\text{-level}=0.489$



Faults from
Review :
 $p\text{-level}=0.212$



Non-conformities:
 $p\text{-level}=0.633$



DIB

A significant difference **DOES NOT** exist

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Hypotheses for Lack of Differences

- ⇒ The specific project management
- ⇒ The tasks are independent of each other
 - They can be executed concurrently
- ⇒ The application domain is well-known by both sites
- ⇒ Homogeneity of behavior of sites
 - because both belonging to the same company, certified CMM 3



Lessons Learned

⇒ Need of an adequate management of:

- ❑ strategic issues
- ❑ cultural issues
- ❑ technical issues

to make effective distribution of software process

⇒ This allows to

- ❑ execute independent tasks
- ❑ exploit proper skills wherever they are

