

BiVeS & BudHat

Difference Detection for Computational Models

MARTIN SCHARM

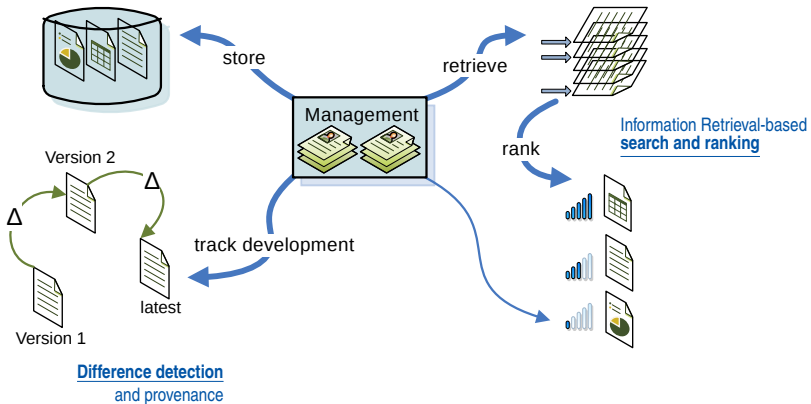
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University of Rostock

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COMBINE 2013

Format-independent,
graph-based storage



<http://sems.uni-rostock.de/>

Provenance represents the seven W's (Who, What, Where, Why, When, Which, (W)how).

– Goble 2002



Music
and Arts



Literature

REFERENCES

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Hollander, M. et al. (2005) Metadata: a central concept in computerized history methods. *IEEE*, 14, 421-429.

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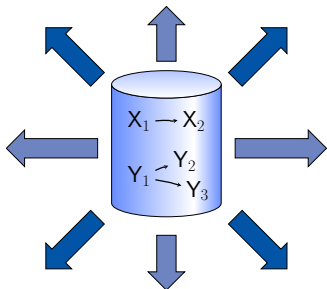
Hollander, M. et al. (2011) Integrating systems history methods and Nonredundant mappings. *IEEE Rev. Syst.*, 8, 124.

```

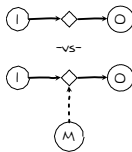
14
15 my $SERVER = "http://www.ghost-agent.com";
16 my $SEMPKEY = "151";
17 my $SEMPKEY = "151";
18 my $SCRIPT = "http://www.ghost-agent.com";
19 my $SCRIPT = "http://www.ghost-agent.com";
20
21 my $script = "http://www.ghost-agent.com";
22 my $key = "151";
23
24 usage ($script) if ($? == 0);
25
26 my $content = string_from_http($SERVER, $script, $key);
27
28 my $url = "http://www.ghost-agent.com";
29 my $url = "http://www.ghost-agent.com";
30 my $url = "http://www.ghost-agent.com";
31 my $url = "http://www.ghost-agent.com";

```

Code



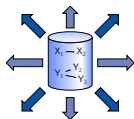
Availability & Identity



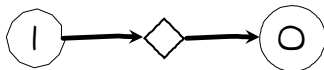
Difference Detection



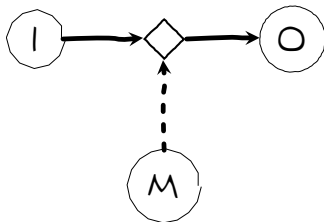
Interpretation



Availability
& Identity



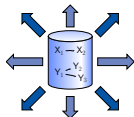
-VS-



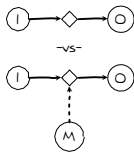
Difference Detection



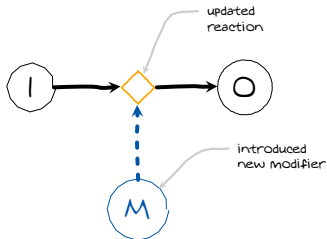
Interpretation



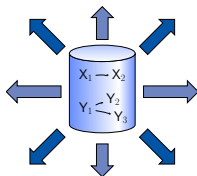
Availability
& Identity



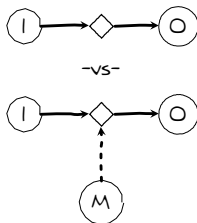
Difference
Detection



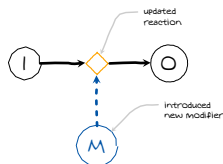
Interpretation



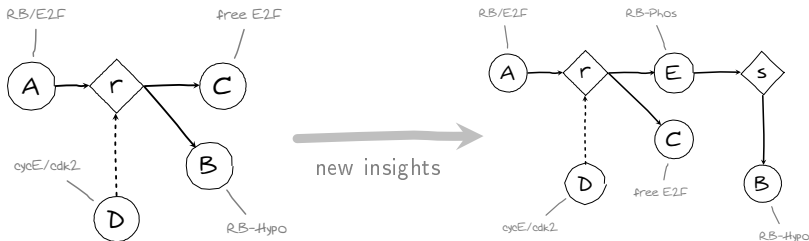
**Availability
& Identity**



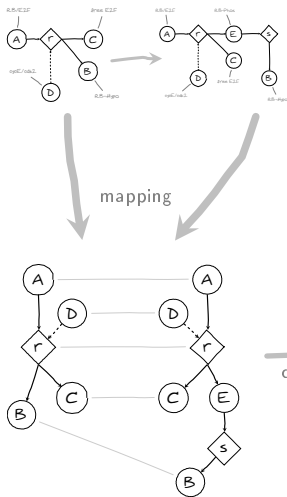
**Difference
Detection**





Interpretation



Waltemath *et al.*: Improving the reuse of computational models through version control. *Bioinformatics* (2013) 29(6): 742-728;

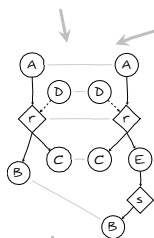


Biochemical Model Version Control System


- compares models encoded in standardized formats (currently:  and )
- maps hierarchically structured content
- constructs a diff (in XML format)
- is able to interpret this diff

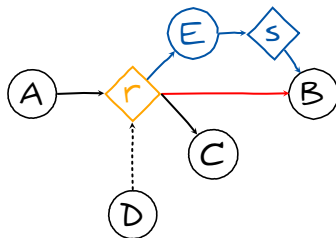
```

<XML>
  Diff
  |
  |--- moves
  |   |
  |   |--- product of r: C
  |
  |--- deletes
  |   |
  |   |--- product of r: B
  |
  |--- inserts
  |   |
  |   |--- species: E
  |   |--- product of r: E
  |   |--- reaction s
  |
  </XML>
  
```



```
<XML>
Diff
├── moves
│   └── product of r: C
├── deletes
│   └── product of r: B
├── inserts
│   ├── species: E
│   ├── product of r: E
│   └── reaction s
</XML>
```

- calls BiVeS to construct the diff
- displays the result in various formats
 - the XML diff
 - a reaction network highlighting the changes using 
 - a human readable report





BudHat in action!

<http://budhat.sems.uni-rostock.de>



jvm

network

cmd

```
import de.uni-rostock.sems.bives.api.SBMLDiff;

[...]

SBMLDiff differ = new SBMLDiff (sbmlFileA, sbmlFileB);
differ.mapTrees ();
String graph = differ.getCRNGraphML ();

[...]
```



jvm

network

cmd

```
curl -d '{
  "get":
  [
    "documentType",
    "xmlDiff"
  ],
  "files":
  {
    "versionA": "http://your.db/path/to/versionA.sbml",
    "versionB": "http://your.db/path/to/versionA.sbml"
  }
}' http://bives.server.tld
```

jvm

network

cmd

```
java -jar BiVeS.jar path/to/versionA path/to/versionB
```



```
git diff 88fealcddf b64477d742 model.file
```



- BiVeS = Difference detection for hierarchically structured content
- BudHat = Prototypic web interface to demonstrate how BiVeS can be used to communicate the differences

That's it! Stay tuned ;-)

 @SemsProject

<http://sems.uni-rostock.de>

<http://budhat.sems.uni-rostock.de>

Questions? Suggestions? Recommendations? Drop me an email:

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