

変化している世界を変化しよう

# ソフトウェア工学における 双方向プログラミング

Lionel Montrieux – Zirun Zhu – Tao Zan - Zhenjiang Hu

## BiFluX: XML document synchronization    Access control for data synchronization

BiFluX is a bidirectional programming language for XML documents

```

event:
  start: 14:00
  end: 15:00
  name: group meeting
  note: prepare slides
  location: room 1611 2005
  private: False
event:
  start: 20:00
  end: 22:00
  name: dinner
  note: meet Mr. Creosote
  location: restaurant
  private: True
event:
  start: 16:00
  end: 17:00
  name: Skype meeting
  note: /
  location: room 1316A
  private: False

```



```

event:
  start: 14:00
  end: 15:00
  name: group meeting
  location: room 1611 2005
event:
  start: 16:00
  end: 17:00
  name: Skype meeting
  location: room 1316A

```

<http://www.prg.nii.ac.jp/projects/BiFluX/>

Complex policies provide expressive, attribute-based access control for bidirectional programs through filtering

```

rule CalCreate {
  action create
  action update
  resource /calview/* matching-by name/text()
  condition $workingHours
}

```

```

event:
  start: 14:00
  end: 15:00
  name: group meeting
  note: prepare slides
  location: room 1611
  private: False
event:
  start: 20:00
  end: 22:00
  name: dinner
  note: meet Mr. Creosote
  location: restaurant
  private: True

```



```

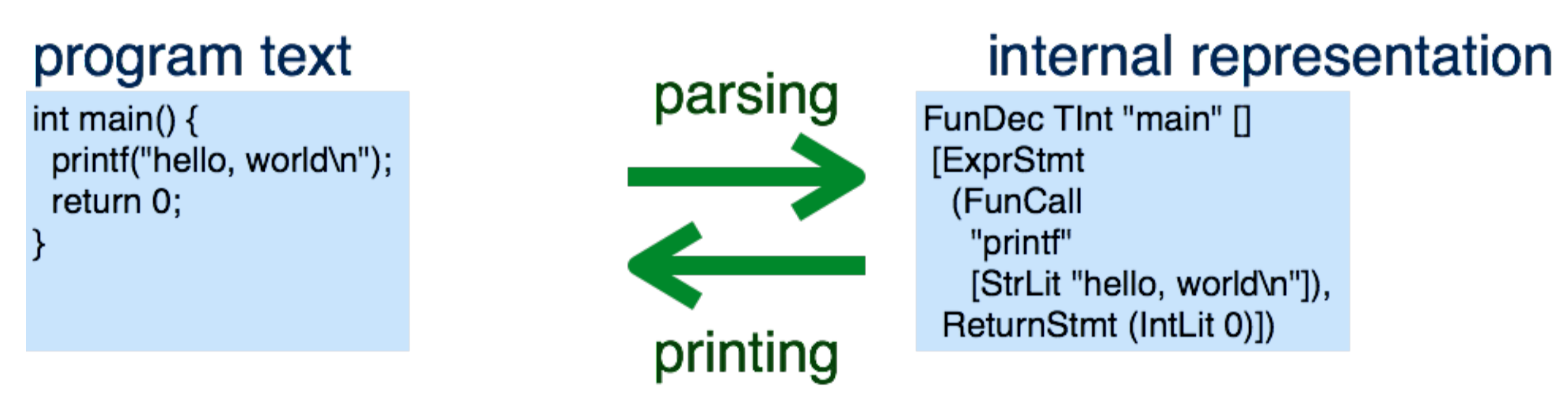
event:
  start: 14:00
  end: 15:00
  name: group meeting
  location: room 1611
event:
  start: 16:00
  end: 17:00
  name: Skype meeting
  location: room 1316A

```

[https://bitbucket.org/prl\\_tokyo/bxaz](https://bitbucket.org/prl_tokyo/bxaz)

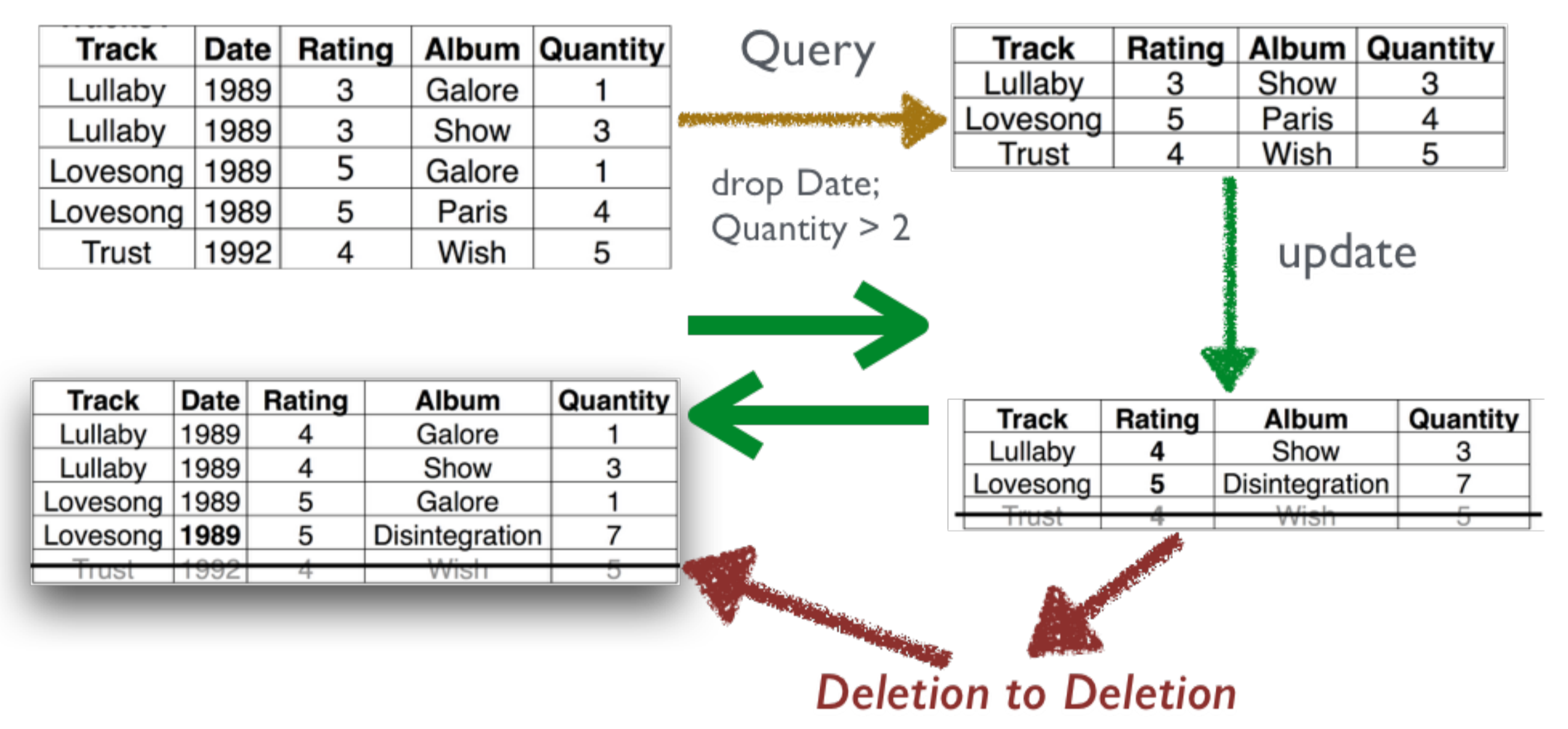
## BiYacc    BRUL: view-updating in databases

BiYacc provides a parser and a pretty printer for programming languages – all in one bidirectional program



<http://www.prg.nii.ac.jp/project/biyacc.html>

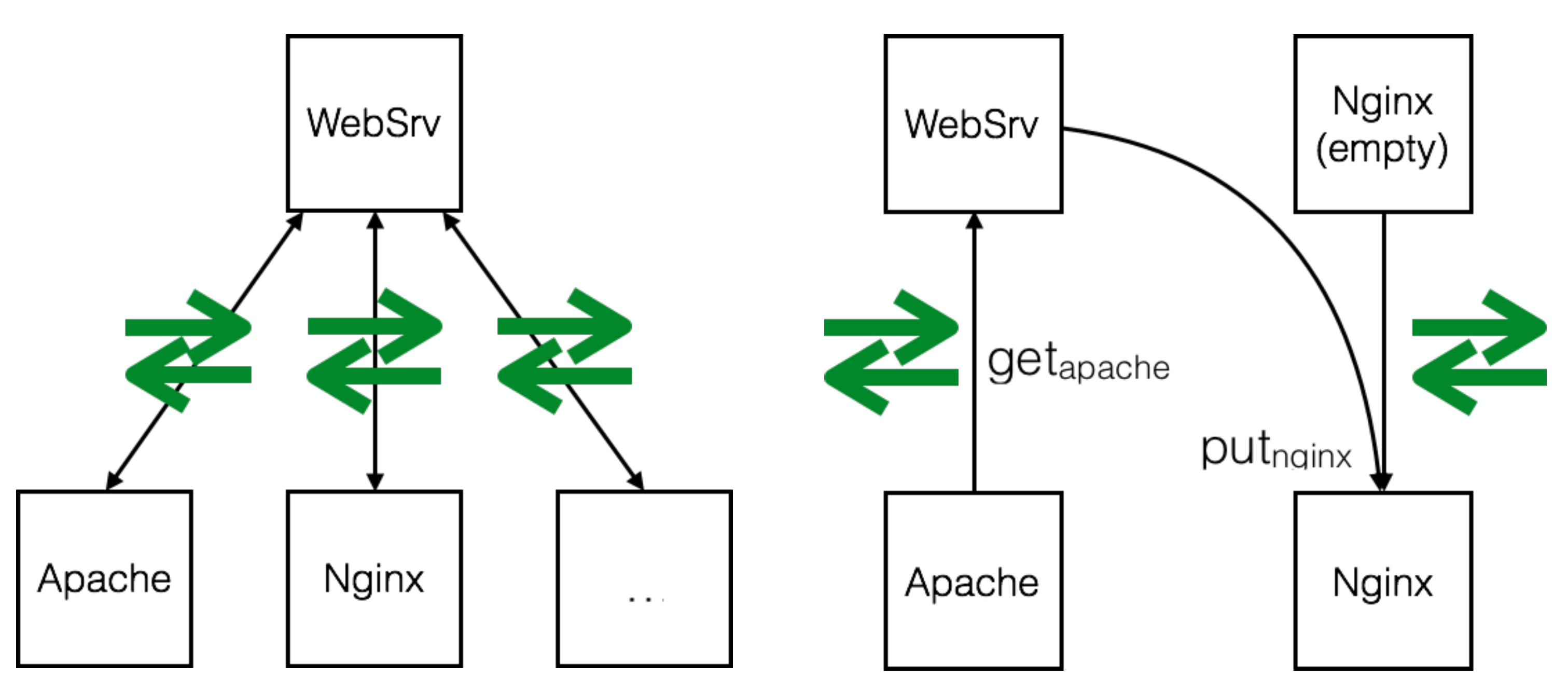
BRUL is a better way to solve the view-update problem in SQL databases



<http://www.prg.nii.ac.jp/project/brul/>

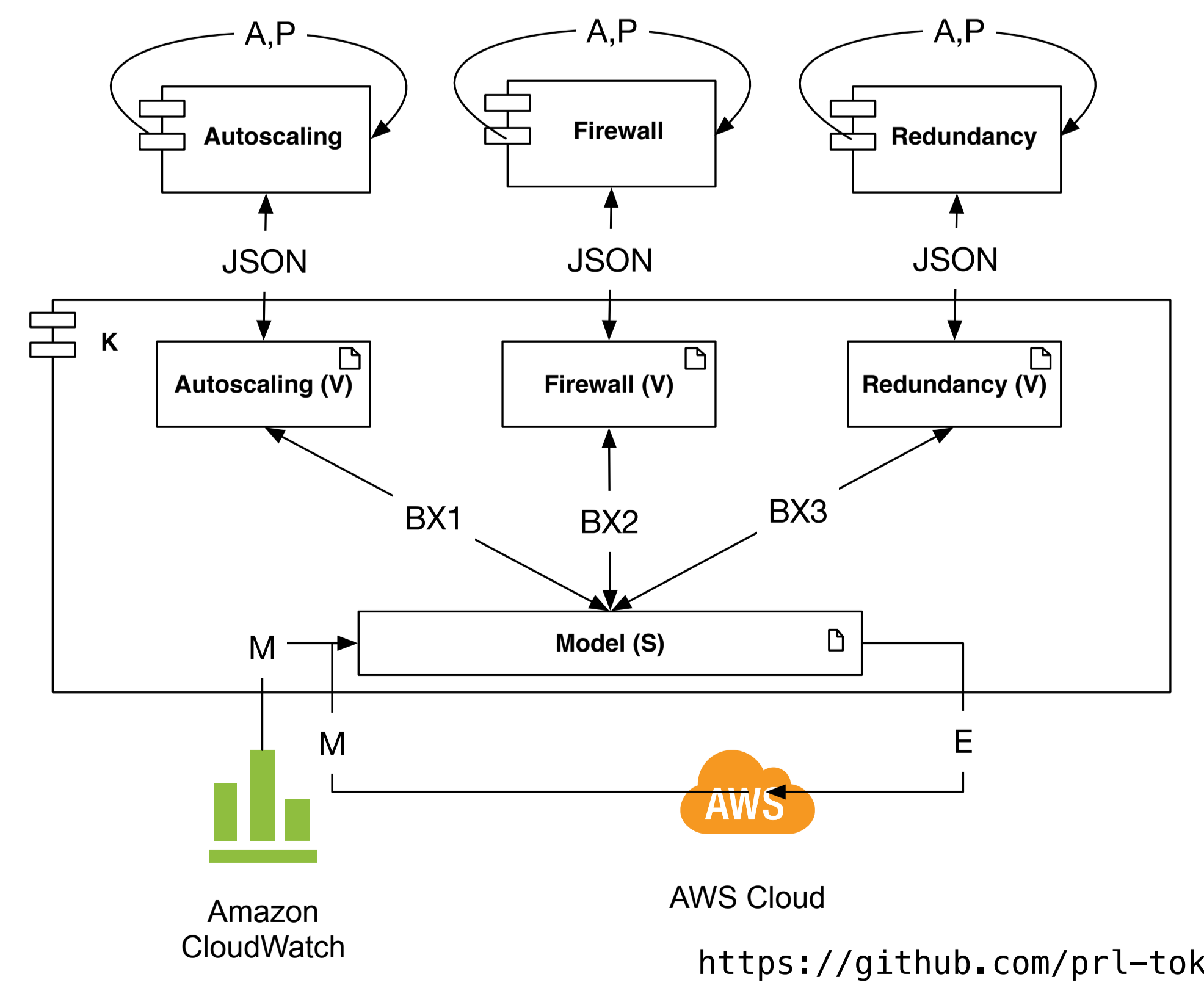
## Configuration synchronization    Self-adaptive systems

Bidirectional programs guarantee correct synchronization between concrete and abstract models – and provide migration for free!



<https://github.com/prl-tokyo/bigul-configuration-adaptation>

Separation of concerns in self-adaptive systems enables more efficient, and reusable, feedback loops



<https://github.com/prl-tokyo/MAPE-experiment>