Aspect-oriented workflow patterns for web service composition

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Outline

- Web service compositions
- Plug and play compositions using the SCE
- Crosscutting concerns in compositions
- AOP with Padus
- Directions for Padus

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Keywords

- AOP
- Workflows
- Webservice composition

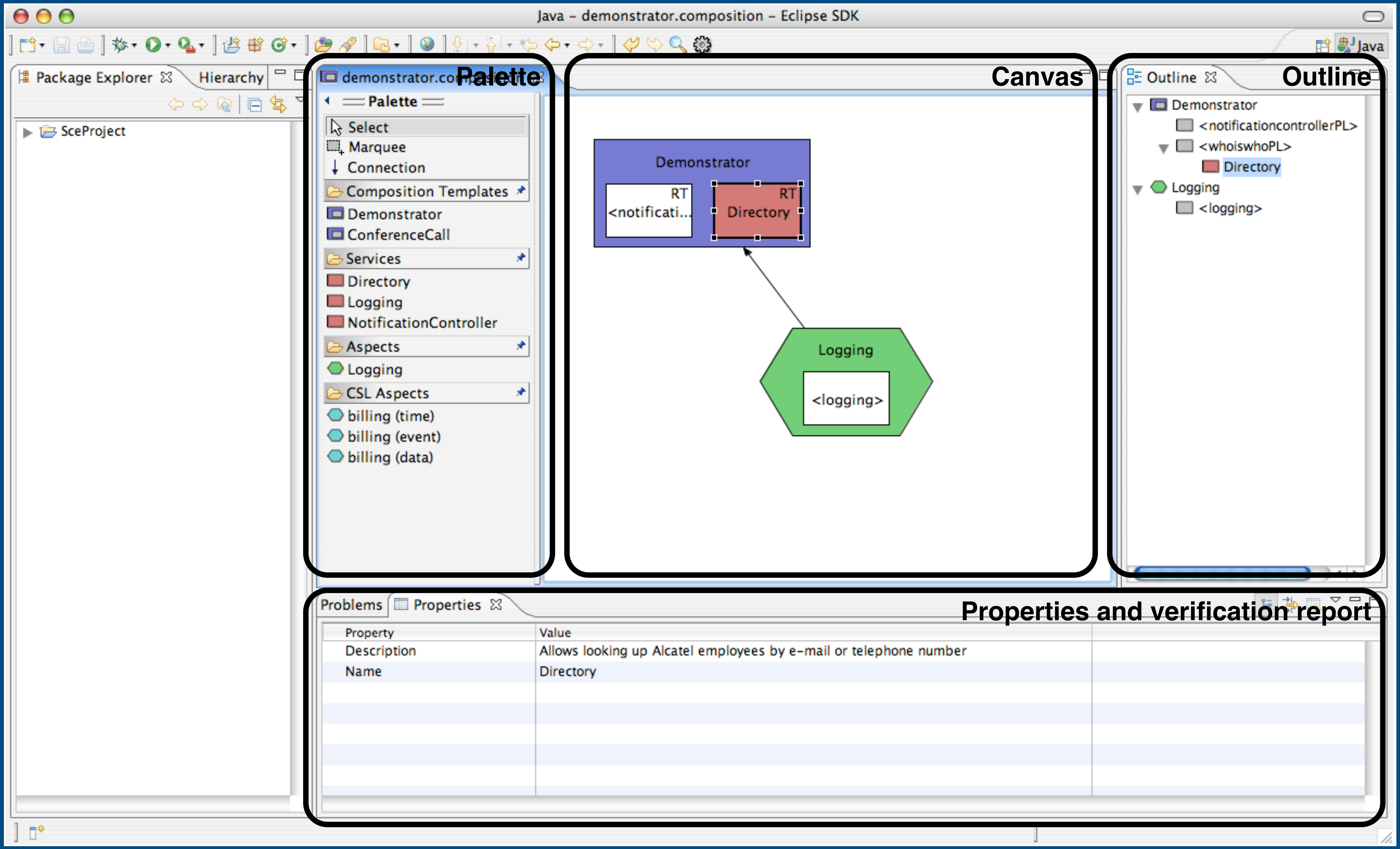
Web service composition

- Web services expose existing software as external services, through standardized protocols
- Compositions add value by providing more advanced services
- Specialized languages to express these compositions, e.g. WS-BPEL

Service creation environment

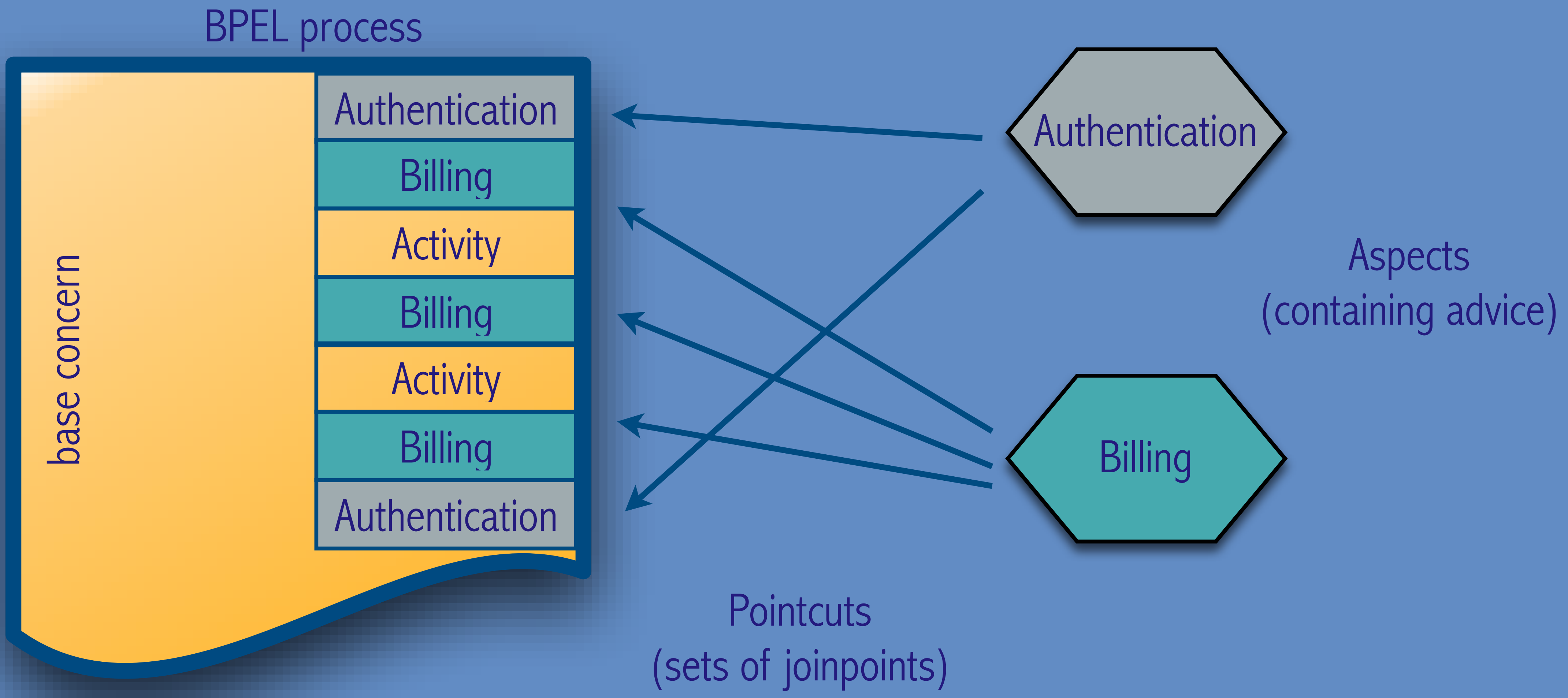
- Create web service compositions on a higher level of abstraction
- Plug-and-play composition of building blocks in a visual editor
- Developer is guided in creating valid compositions

SCE Screenshot



Property	Value
Description	Allows looking up Alcatel employees by e-mail or telephone number
Name	Directory

Crosscutting concerns



Padus aspects

```
<aspect ...>
  <using>
    <namespace ... />
    <partnerLink ... />
    <variable ... />
  </using>
  <before joinpoint=“Jp”
        pointcut=“invoking(Jp, ‘MyService’, ‘MyPortType’, Op)”>
    <bpws:sequence>
      <bpws:assign>...</bpws:assign>
      <bpws:invoke ... />
    </bpws:sequence>
  </before>
</aspect>
```

Padus aspects

Adding namespaces, partner links, variables

```
<aspect ...>
  <using>
    <namespace ... />
    <partnerLink ... />
    <variable ... />
  </using>
  <before joinpoint="Jp"
       pointcut="invoking(Jp, 'MyService', 'MyPortType', Op)">
    <bpws:sequence>
      <bpws:assign>...</bpws:assign>
      <bpws:invoke ... />
    </bpws:sequence>
  </before>
</aspect>
```

Padus aspects

```
<aspect ...>
  <using>
    <namespace ... />
    <partnerLink ... />
    <variable ... />
  </using>
  <before joinpoint="Jp"                                    Pointcut ("where?")
       pointcut="invoking(Jp, 'MyService', 'MyPortType', Op)">
    <bpws:sequence>
      <bpws:assign>...</bpws:assign>
      <bpws:invoke ... />
    </bpws:sequence>
  </before>
</aspect>
```

Padus aspects

```
<aspect ...>
  <using>
    <namespace ... />
    <partnerLink ... />
    <variable ... />
  </using>
  <before joinpoint="Jp"
       pointcut="invoking(Jp, 'MyService', 'MyPortType', Op)">
    <bpws:sequence>                                    Advice ("what?")
      <bpws:assign>...</bpws:assign>
      <bpws:invoke ... />
    </bpws:sequence>
  </before>
</aspect>
```

Padus key concepts

- Pointcuts are logic queries
- Static weaver
  Weaving = modifying logic representation
  of BPEL process
- Separate connector to apply aspects to processes and specify interaction resolution

Future directions

- Workflow specific advice types
- Protocol-based pointcuts
- Describe AO approach for workflow patterns

Workflow patterns

- Requirements for workflow languages,
  not specific to one language
- Describe control flow constructs
- Range from simple “sequence” pattern to complex patterns for synchronization

Collaboration

- Looking for collaboration on these topics
  - AOP for workflow languages, web services
  - web service composition, WS-BPEL

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WP1 Programming languages
WP2 Modelling languages

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Thank you.