Cadena 2.0: Scripting Architecture

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http://cadena.projects.cis.ksu.edu/

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IBM, Intel, Sun Microsystems

Overview

- Scripting Framework
- Filtering
- Generation

Scripting Framework

- Cadena includes a scripting framework
  - This allows users of Cadena to
    - Quickly prototype new features without having to write Eclipse plugins
    - Share small snippets of business logic
    - Make use of the filtering and generation capabilities currently implemented
  - The current framework uses the Python language with the Jython interpreter
    - Provides access to the Cadena object model

Filtering

- Filtering allows the user to customize the view of a Cadena model
- Filters can be combined into a “pipeline”
- For example, we may want to show only components (filtering out all connections)
- For example, we may want to show only components, and the associated connections (filtering out all sub-scenarios)

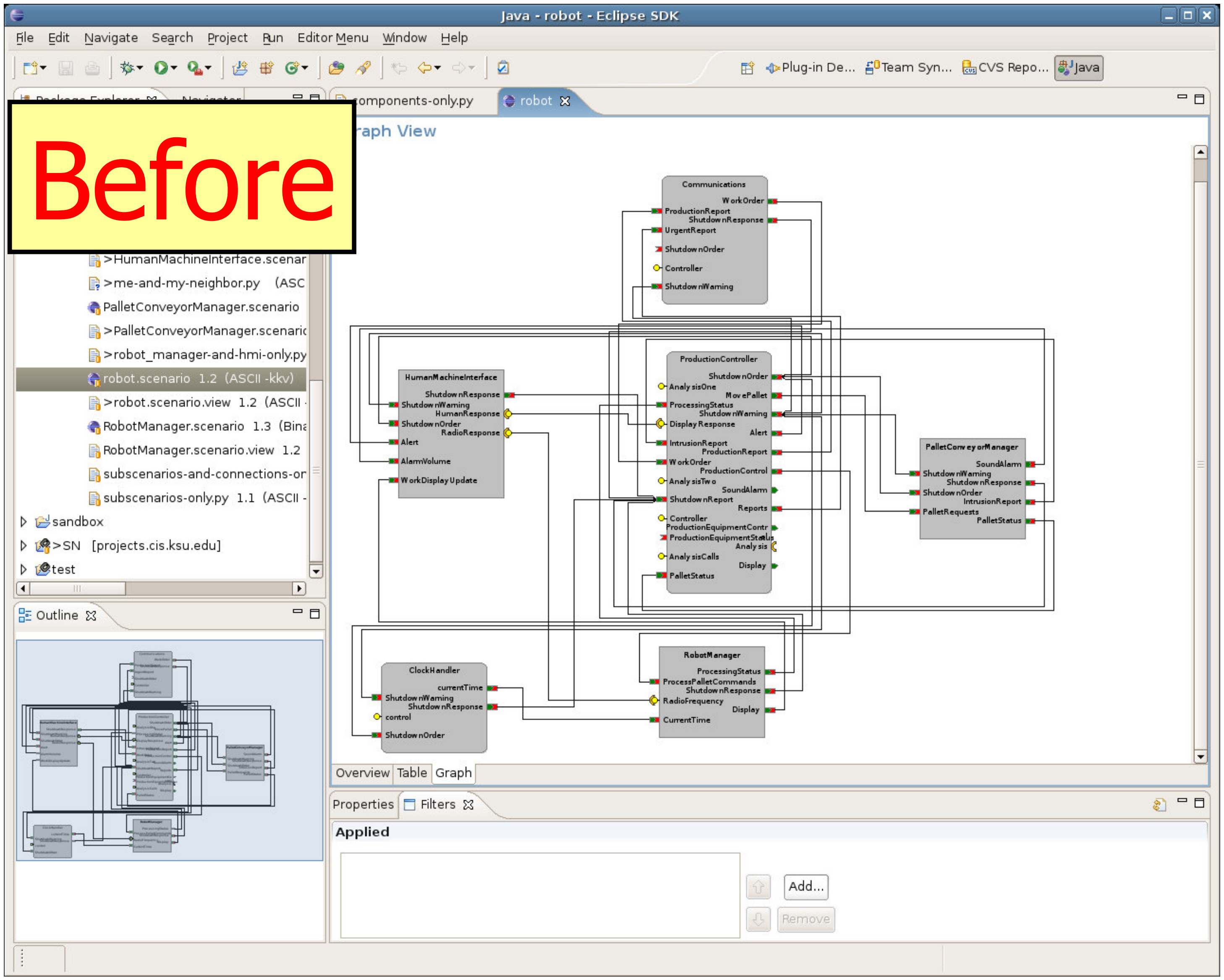
Filtering - Just Components

- In this example we are only interested in seeing components. Put another way, we want to filter out all of the connections.

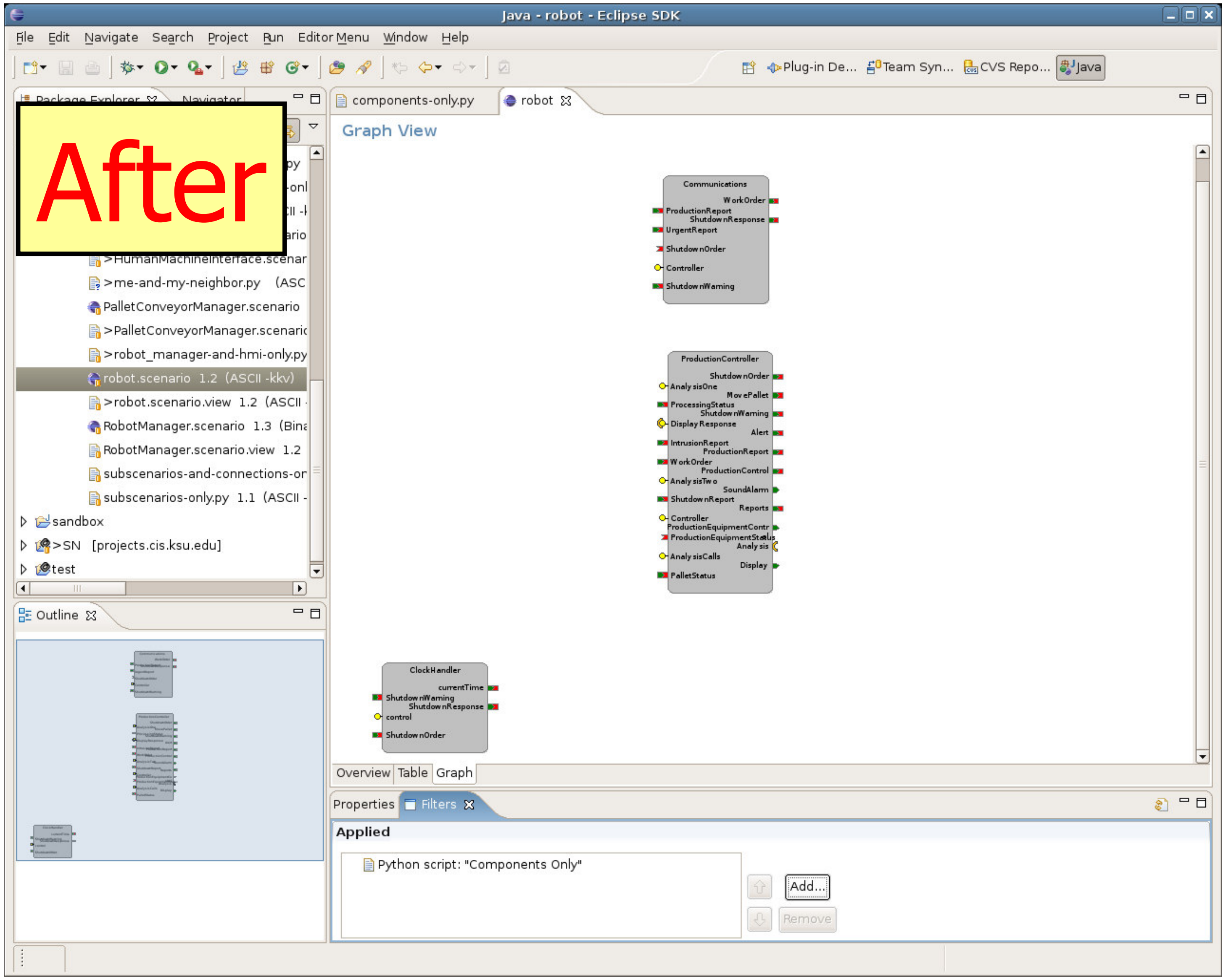
```
def filterScenario(scenario, prevStageResults):
        comps = scenario.componentInstances
        return {}.fromkeys([] + comps, FilterAction.SHOW)
```

Filtering - Just Components (contd)

Before



Filtering - Just Components (contd)



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Outline
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ProductionController
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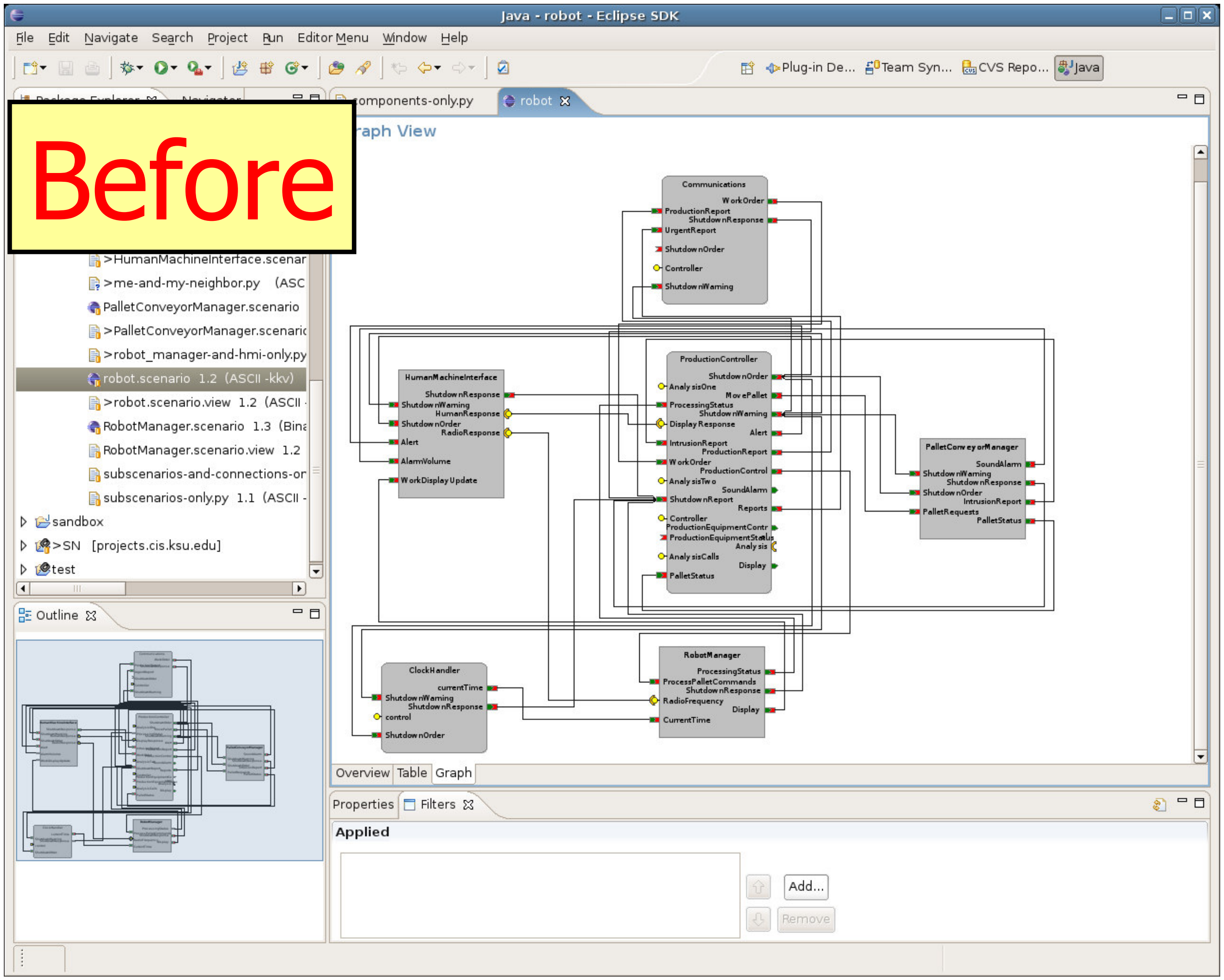
Filtering - No Sub-Scenarios

- In this example, we are only interested in seeing components and their connections and do not wish to see any sub-scenarios.

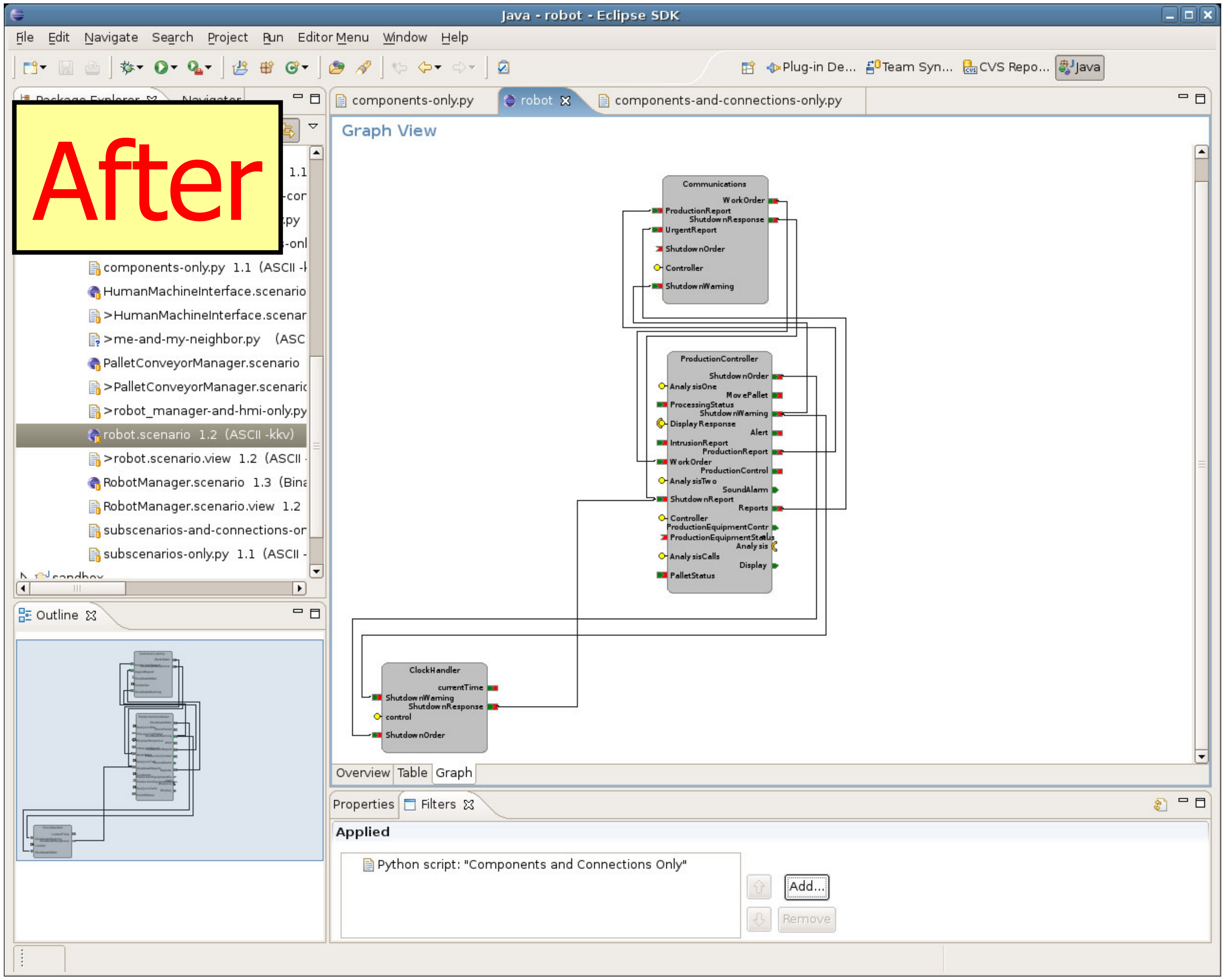
```
def forall(set, predicate): return reduce(lambda r, x: r and predicate(x), set, True)

def filterScenario(scenario, prevStageResults):
        comps = scenario.componentInstances
        conns = filter(
                lambda conn:
                        forall(conn.portBindings, lambda pb: pb.instance in comps),
                scenario.getTypedConnectors())
        pbs = reduce(
                lambda x, y: x +y,
                map(lambda conn: filter(lambda pb: pb.instance in comps, conn.portBindings),
                conns), [])

        return {}.fromkeys([] + comps + conns + pbs, FilterAction.SHOW)
```

Filtering - No Sub-Scenarios (contd)

Before



Filtering - No Sub-Scenarios (contd)



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Python script: "Components and Connections Only"

Generation

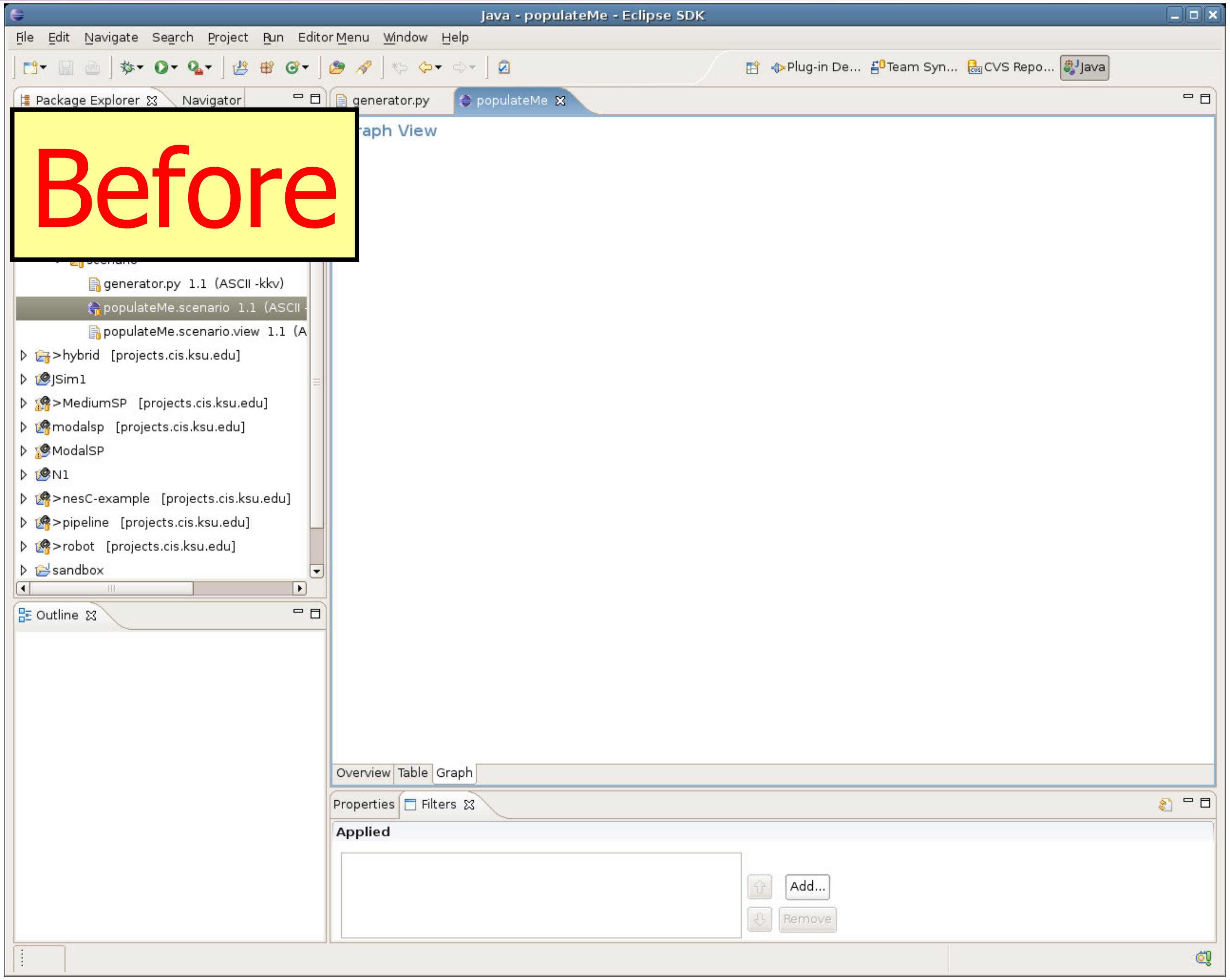
- Generation allows the user to automate the generation of models
- For example, a user may want to generate a certain number of components of a certain type with a certain set of connections. This may be useful when testing or experimenting with a set of modules/components.

Generation Example - Pipeline

- In this example we simply want to generate a source and sink along with 10 intermediate links (named link0-9) for the information to traverse through.

```
sink = createComponentInstance(bmModal, “sink”)
source = createComponentInstance(bmModal, “source”)
self.addComponent(scenario, sink)
self.addComponent(scenario, source)
self.addConnector(scenario,
        createConnector(
                prismEventConnector,
                {
                        “usesSide”: (source, “outDataAvailable),
                        “providesSide”: (sink, “inDataAvailable”)
                }))
```

Generation Example - Pipeline (contd)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>pipeline [projects.cis.ksu.edu]
>robot [projects.cis.ksu.edu]
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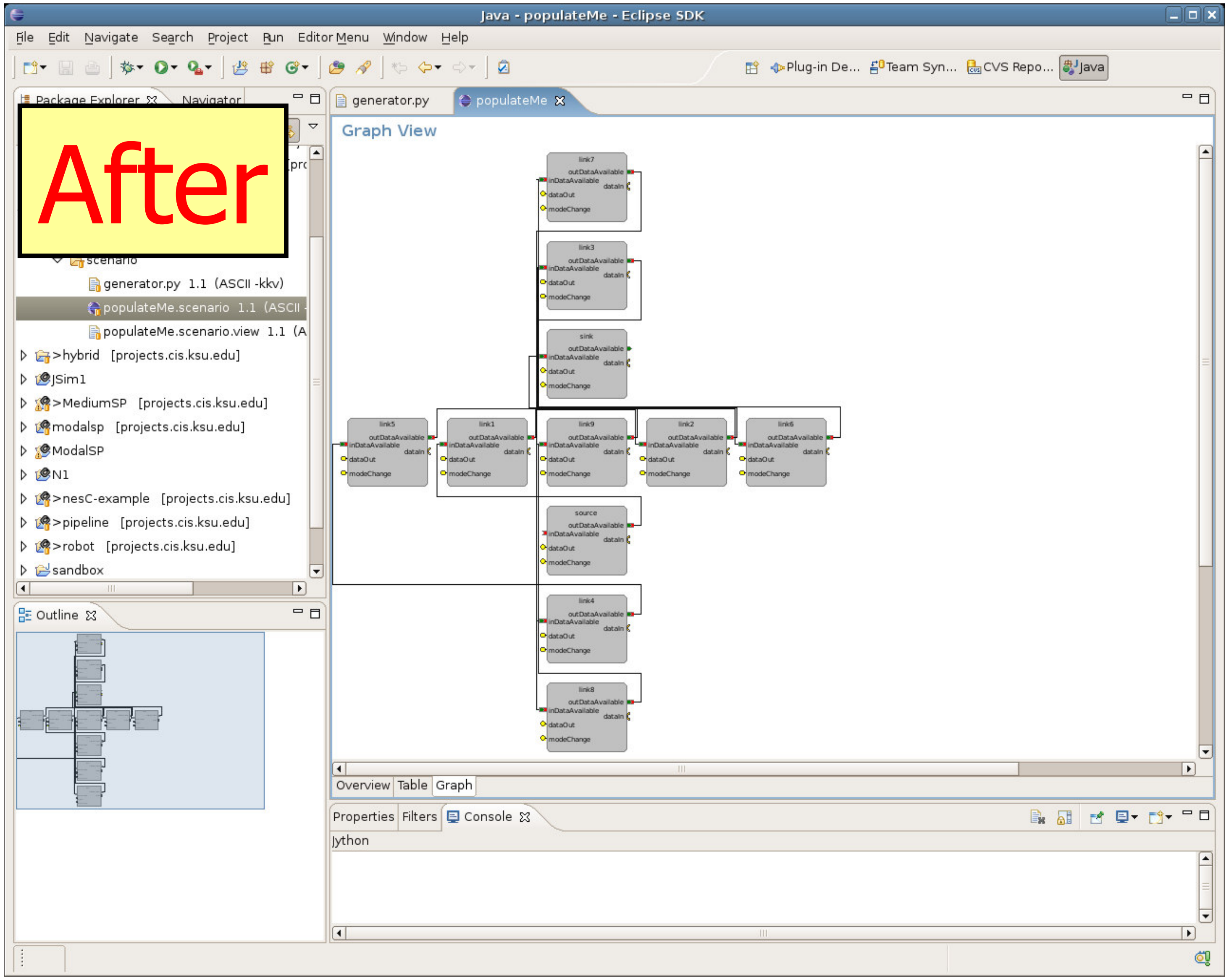
Generation Example - Pipeline (contd)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link6
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link4
link8
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inDataAvailable
dataIn
dataOut
modeChange
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Jython

Conclusion

- The scripting framework allows a user to quickly develop business logic
- The framework could be extended to handle different languages (e.g., JavaScript, Groovy)
- More information can be found in the Cadena Manual Chapter 6