FRIENDLY SAM
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Research Institutes of Sweden
Built environment
Energy and circular economy
Friendly Sam

- A toolbox for optimization models
- Core concept: Resource flow between nodes
- Nodes process and alter resources
- Nodes are instances of predefined archetypes
Friendly Sam

- Nodes are instances of predefined archetypes
  - Power plants
  - Consumers
  - Customized by user
- Create new archetypes as needed
- Minimal code repetition
Example Node definition

Defining a Boiler class (archetype):

```python
class Boiler(fs.Node):
    """A simple boiler example"""

def __init__(self, fuel=None, variable_cost=None, f_max=None, eta=None, **kwargs):
    super().__init__(**kwargs)

    with fs.namespace(self):
        F = VariableCollection(lb=0, ub=f_max, name='F')

        self.consumption[fuel] = F
        self.production[Resources.heat] = lambda t: eta * F(t)
        self.cost = lambda t: self.consumption[fuel](t) * variable_cost
        self.state_variables = lambda t: {F(t)}
```

Adding a boiler to a model:

```python
TeaPot = Boiler(fuel=Resources.Power, variable_cost=0, f_max=0.1, eta=0.9)
```
def make_parts():
    TeaPot = Boiler(fuel=Res...
    TeaDrinker = Consumer(resource=Res...
    parts.add(TeaPot, TeaDrinker)
    return parts

class model(time_unit=1h, step=24h, horizon=72h, t_start=2017-01-01, t_end...):
    m = FriendlySam.MyopicDispatchModel(...)
    m.parts = make_parts()
    return m

def run():
    m.time = t_start
    while m.time <= t_end:
        m.advance()
    return m.result
FIN

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