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The one class decorator to monitor them all

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https://gitlab.com/ska-telescope/ska-tango-exporter

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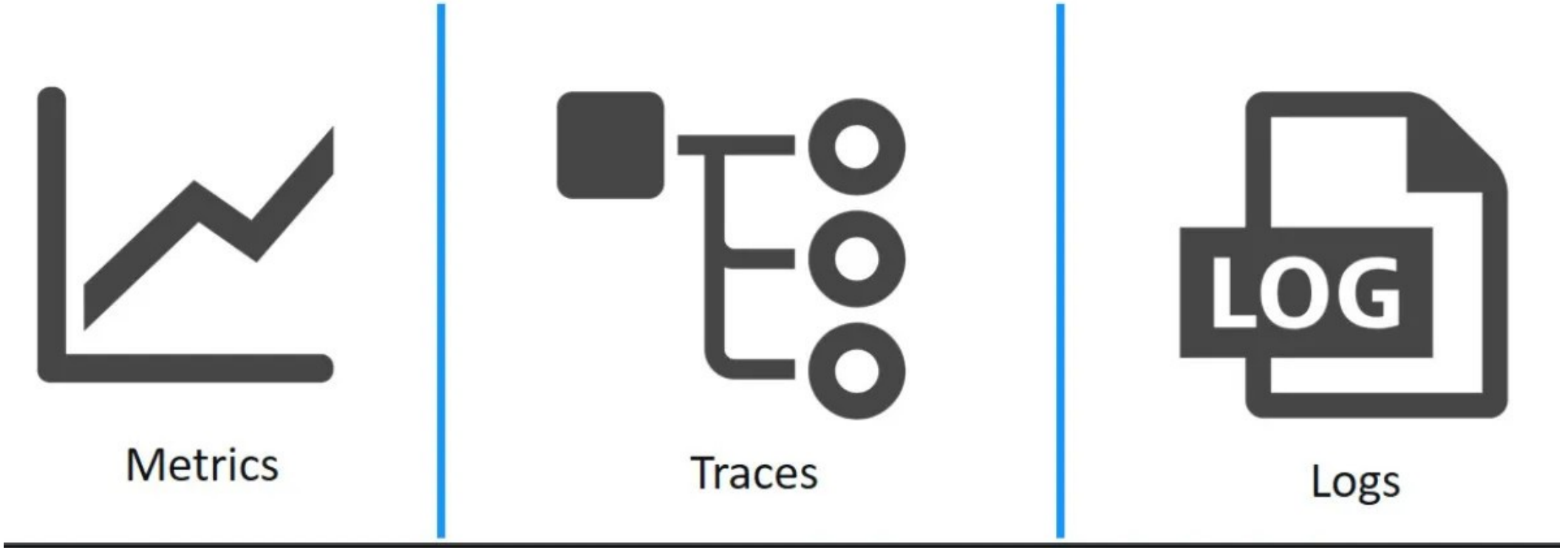
Observability



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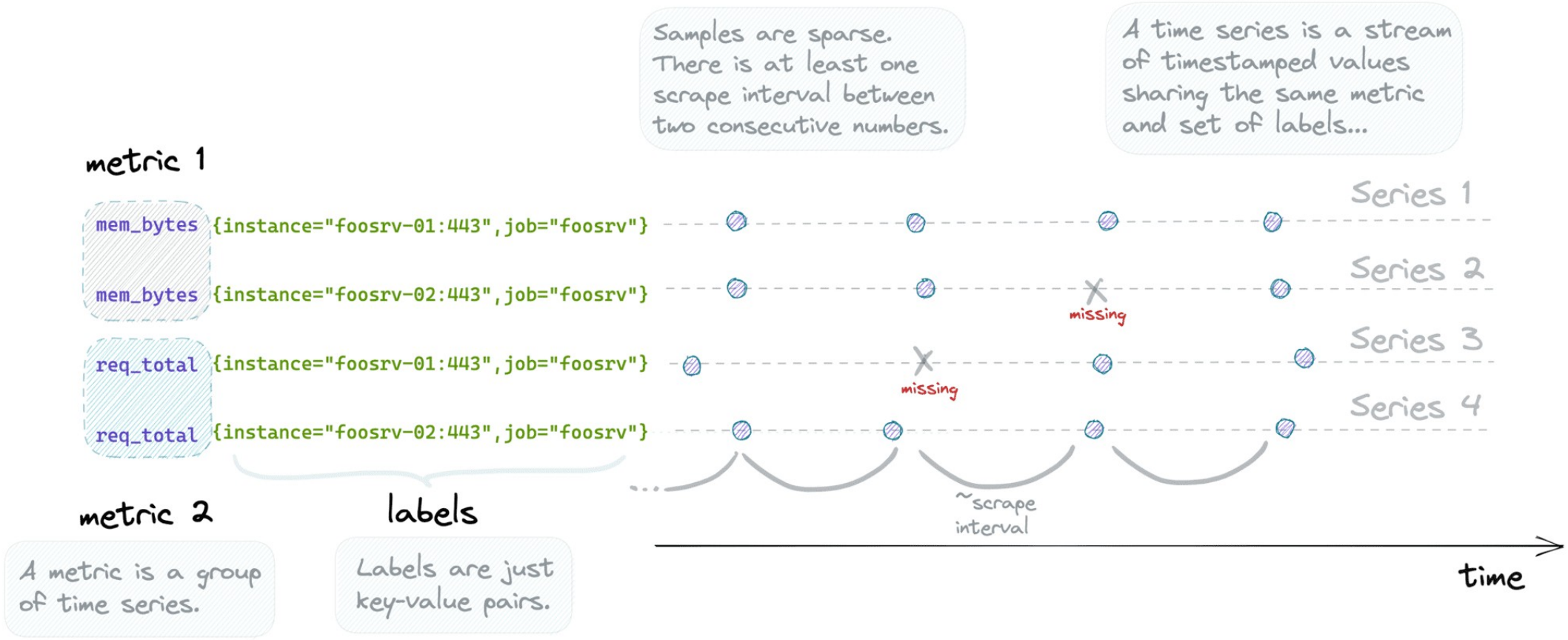
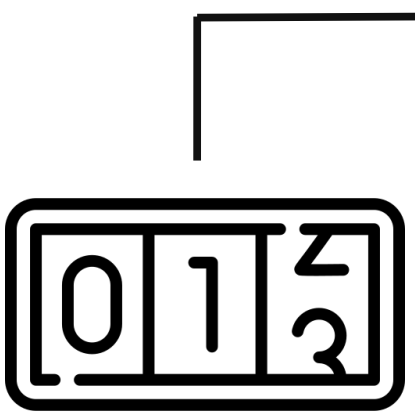
Prometheus

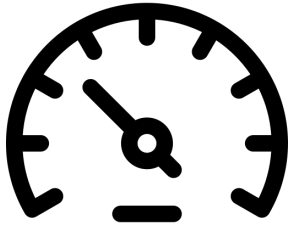


https://iximiuz.com/en/posts/prometheus-metrics-labels-time-series/

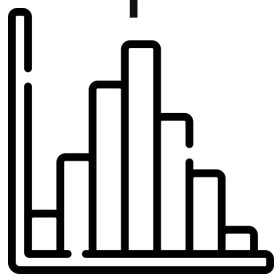
Prometheus - Metric Types



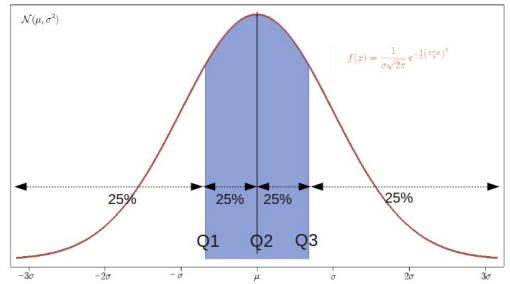
Counter



Gauge



Histogram



Summary

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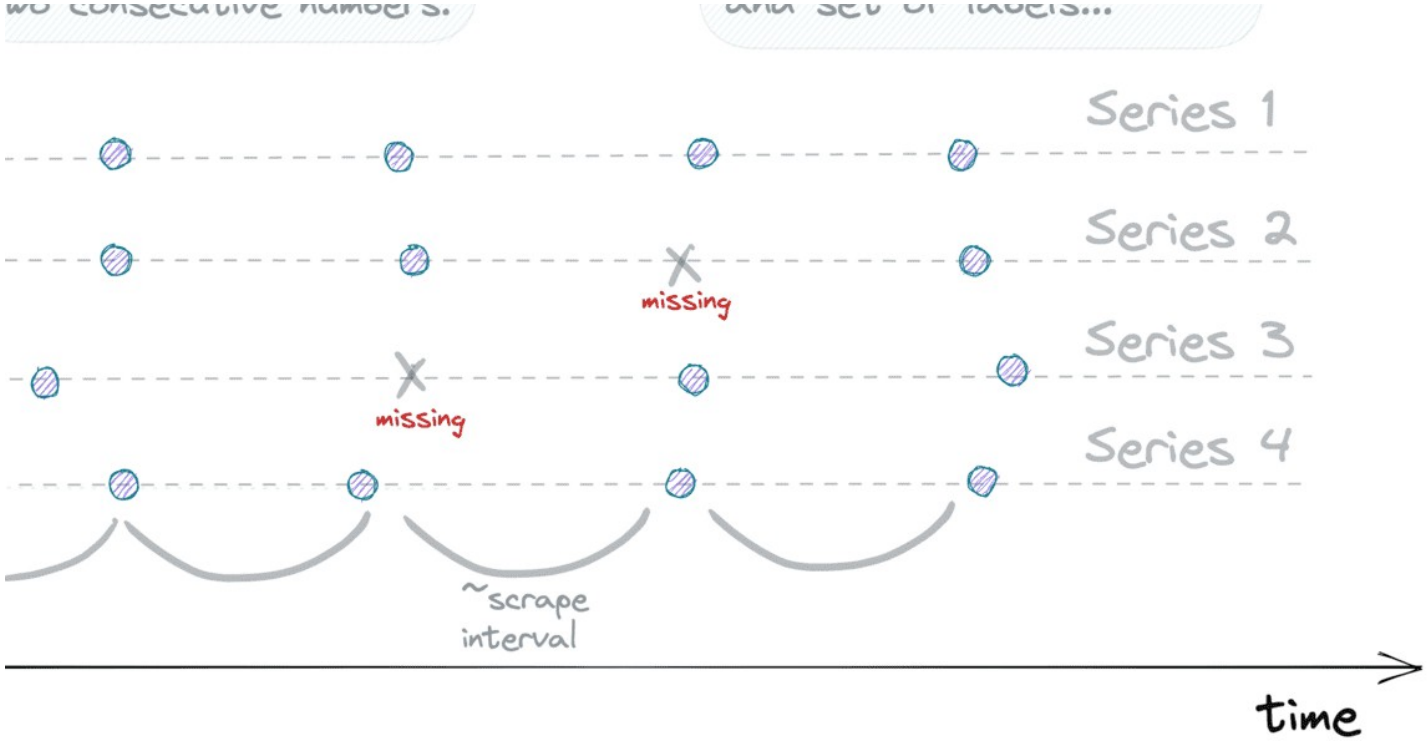
Prometheus – Handling Strings

ds_software_version_: { str_value="23.0.1" }

ds_software_version_: { str_value="18.0.1" }

ds_software_version_: { str_value="19.3.2" }

ds_software_version_: { str_value="21.0.0" }



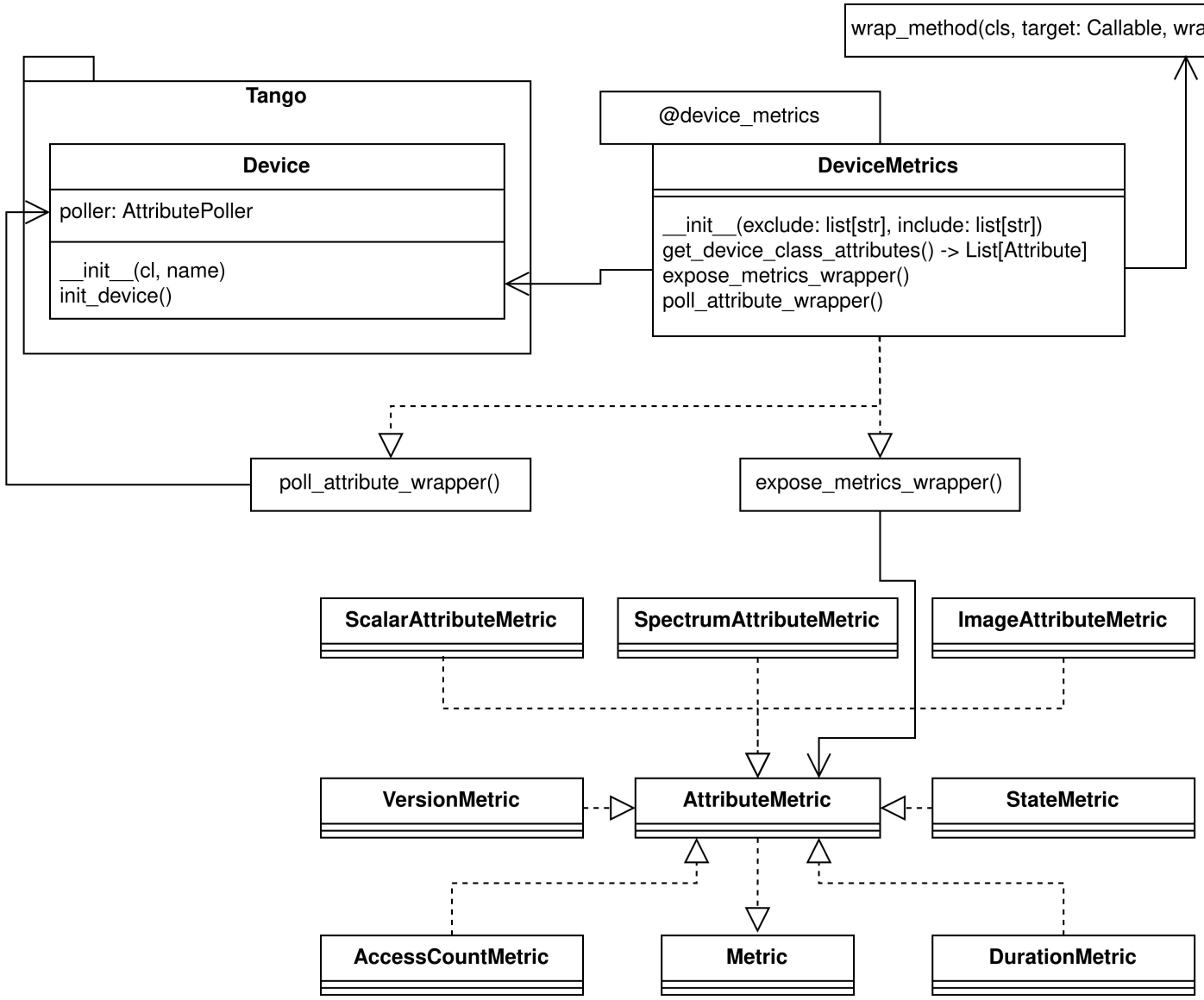
The decorator – How to use

```
@device_metrics(
    exclude=[
        "APSCT_error_R",  # too expensive as they read a lot from hardware
        "APSCT_TEMP_error_R",  # too expensive as they read a lot from hardware
        "APSCT_VOUT_error_R",  # too expensive as they read a lot from hardware
        "*_RW",
    ]
)
class APSCT(OPCUADevice):
```

The decorator – How to use

```python
from prometheus_client import start_http_server, disable_created_metrics

def start_metrics_server(port: int = 8000):
    disable_created_metrics()
    start_http_server(port)

def main(**kwargs):
    args = sys.argv[1:]
    device_class_str = sys.argv[0]
    device_class = getattr(sys.modules["devices"], device_class_str)

    # Setup metrics server (Prometheus endpoint)
    start_metrics_server()

    # Start the device server
    run((device_class,), args=args, **kwargs)
```

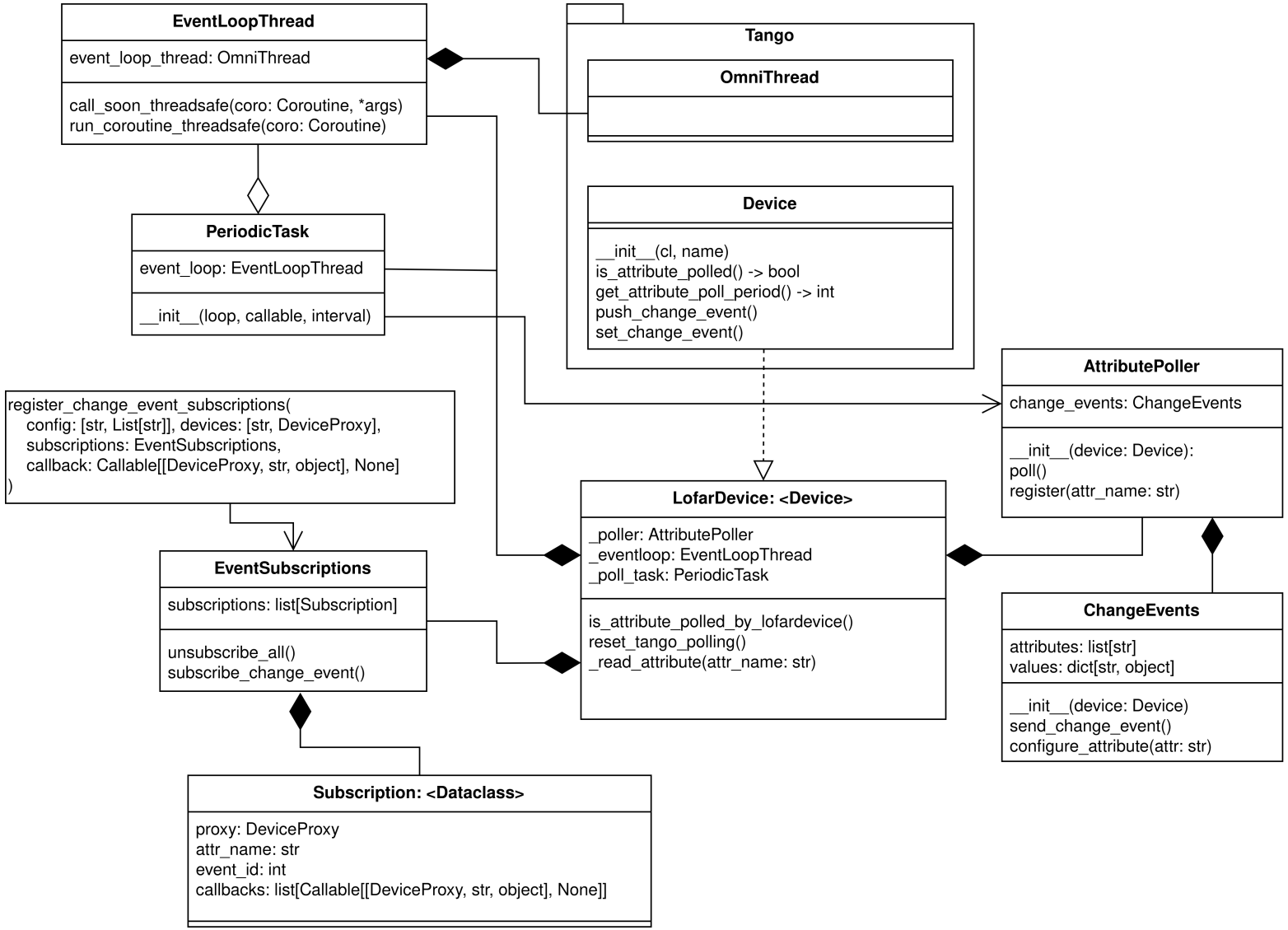
The decorator – How it works




```python
def wrap_method(
    obj: object,
    func: Union[Callable, str],
    wrapper: Callable,
    post_execute: bool = True,
):
    if iscoroutinefunction(func):
        async def pre(instance, *args, **kwargs):
            wrapper(instance, *args, **kwargs)
            return await func(instance, *args, **kwargs)
        async def post(instance, *args, **kwargs):
            return_value = await func(instance, *args, **kwargs)
            wrapper.return_value = return_value
            wrapper(instance, *args, **kwargs)
            return return_value
    else:
        def pre...

    setattr(
        obj,
        func_name,
        functools.update_wrapper(
            post if post_execute else pre,
            func,
        ),
    )
```

The decorator – How it works

The decorator – How it works



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The decorator – How it works

```python
@DurationMetric()
async def _poll(self):
  for attr_name, attr_data in list(self._poll_list.items()):
    if not self.polling_allowed():
      return

    value = await self._read_attribute_nothrow(attr_name)

    if attr_data["metric"]:
      self._update_metric(attr_data["metric"], value)

    ...
        self._send_change_event(attr_name, value)
```

```python
def _read_attribute(self, attr_name: str):
    """Get bound method to read certain attribute."""
    self.get_device_attr().get_attr_by_name(attr_name)

    # obtain the read function (unwrap PyTango's wrapper
    # to avoid interacting with PyTango internals in there).
    read_wrapper = getattr(self, f"__read_{attr_name}_wrapper__")
    while hasattr(read_wrapper, "__wrapped__"):
        read_wrapper = read_wrapper.__wrapped__

    return partial(read_wrapper, self)
```

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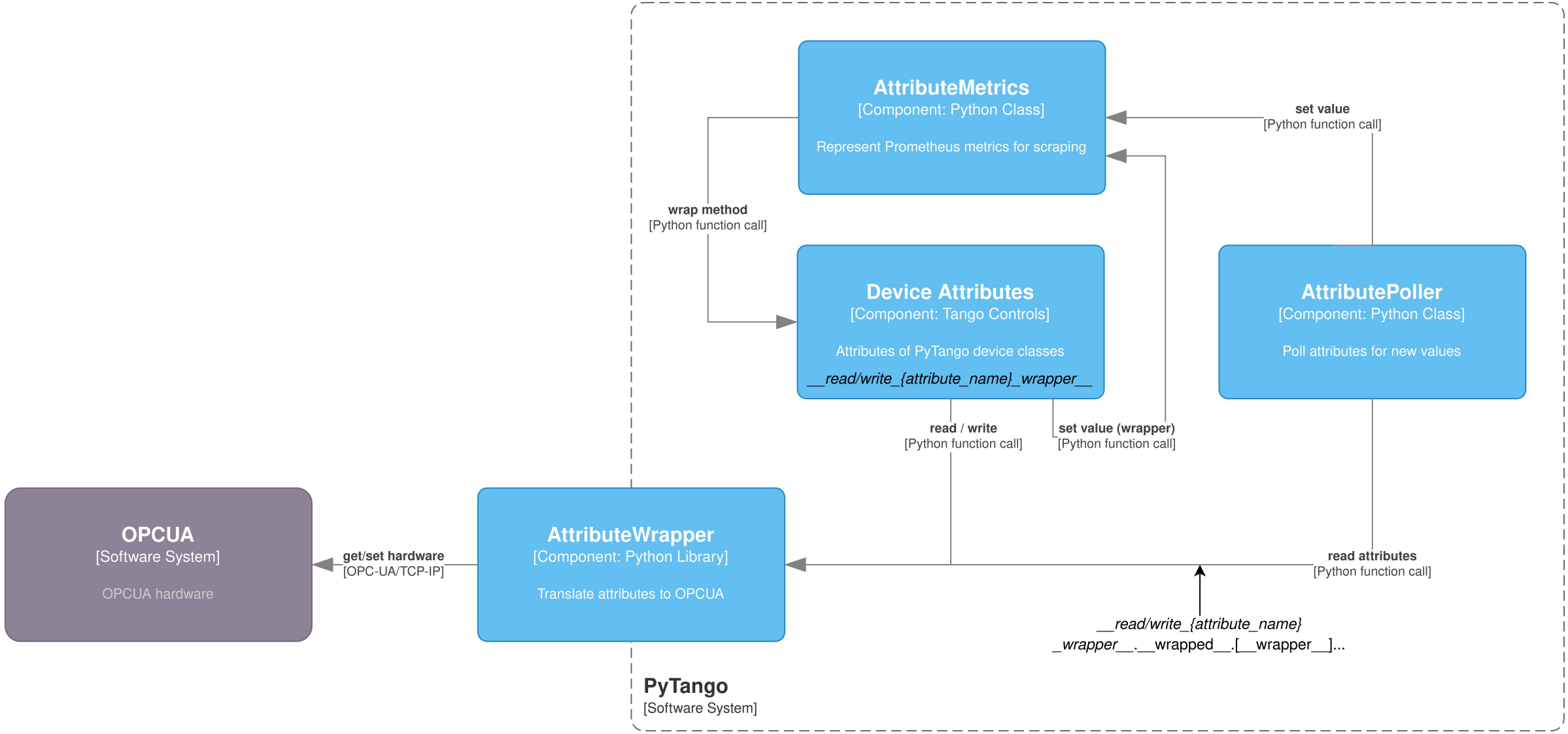
The decorator – Why?



Conclusion

1) Decorator could use some “native-ication” for Tango
2) Prometheus is a very efficiënt and scalable database for time series numerical data
3) Seen an effective scalable strategy to scraping metrics for PyTango devices
4) Very easy to apply to new devices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Dutch stations
Chilbolton
Norderstedt
Bałdy
Potsdam
Borówiec
Łazy
Nançay
Medicina
LOFAR
ERIC

The end

source

https://git.astron.nl/lofar2.0/tango/-/tree/master/tangostationcontrol/metrics?ref_type=heads

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