Measurement and Experiment Specification

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Example: Link Tracing in Emulab

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```
set link0 [$nodeA $nodeB ...]
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```
set link0 [$nodeA $nodeB ...]

$link0 trace
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set link0 [$nodeA $nodeB ...]

$link0 trace

$link0 trace_type packet
```

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set link0 [$nodeA $nodeB ...]

$link0 trace

$link0 trace_type packet
$link0 trace_type header
```

Example: Link Tracing in Emulab

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set link0 [$nodeA $nodeB ...]

$link0 trace

$link0 trace_type packet
$link0 trace_type header
$link0 trace_type monitor
```

Example: Link Tracing in Emulab

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set link0 [$nodeA $nodeB ...]

$link0 trace

$link0 trace_type packet
$link0 trace_type header
$link0 trace_type monitor

$link0 trace_snaplen 128
```

Example: Link Tracing in Emulab

```
set link0 [$nodeA $nodeB ...]

$link0 trace

$link0 trace_type packet
$link0 trace_type header
$link0 trace_type monitor

$link0 trace_snaplen 128

$link0 trace_expr "ip proto tcp"
```
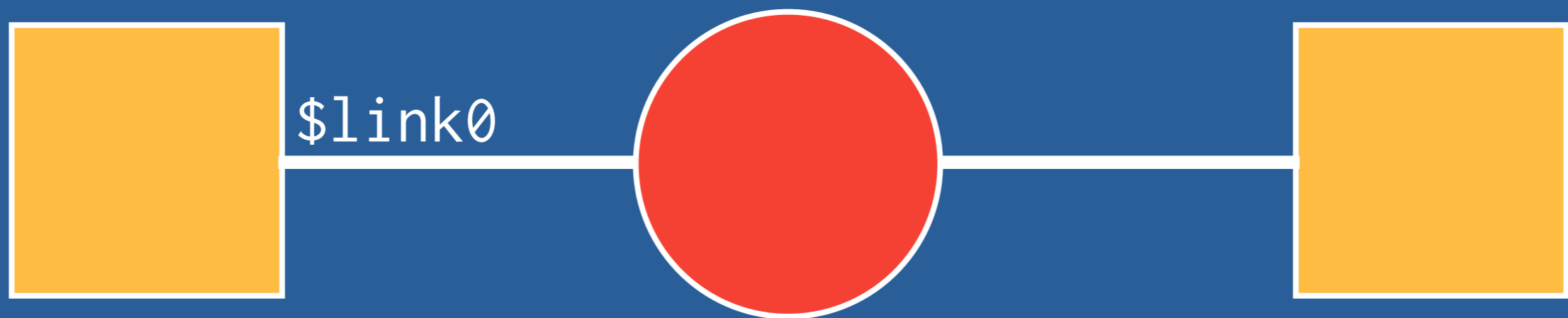
Transparent Capture

Transparent Capture

$link0

Transparent Capture

$link0

Measurement capabilities need to be in the RSpec

Measurement in RSpec

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Resource advertisements help users with component and link selection

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What a slice is allowed to measure will be circumscribed by the definition of the slice

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Resource advertisements help users with component and link selection

What a slice is allowed to measure will be circumscribed by the definition of the slice

Describing measurement hardware itself

Resource Selection

▸ **Some users have specific measurement requirements**

▸ **Question: Best level of abstraction?**

  ▸ **Mark links as "measurable"**

  ▸ **Explicitly include devices in topology**

  ▸ **Dynamic instrumentation**

Boundaries

- ▶ **Once a user has a slice…**
- ▶ **Communication between control framework and measurement service**
- ▶ **Naming of measurement points**

Describing Measurement Devices

▸ **Likely to be described in different terms than "standard" components**

　　▸ Packet rate, capture size

　　▸ Level of protocol decoding

　　▸ Sampling, summarization ability

▸ **Informing user about devices they may have only implicitly requested**