An architecture for metarouting

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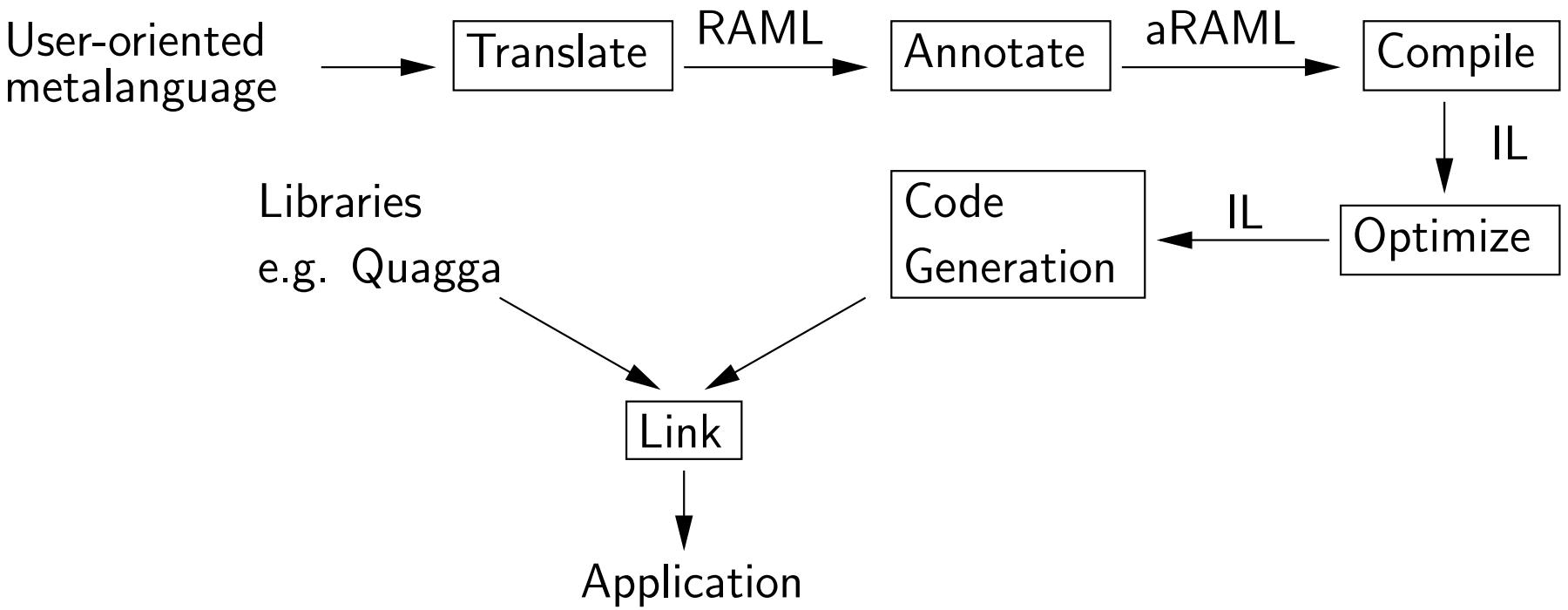
- First ever demonstration of working code

System overview



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- Use with generalised Dijkstra (e.g. OSPF, IS-IS) or vectoring mechanism (e.g. RIP, BGP)

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- Can count to infinity
- Will demonstrate later!

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- No counting to infinity
- Lots of other possible specifications...

Example of generated code

```
static int mrc_int_cmp(mrc_int_t x, mrc_int_t y) {
  return y - x;
}

static int mrc_string_cmp(mrc_string_t x, mrc_string_t y) {
  int res;
  if (x == y)
    res = 0;
  else /* Lexicographic ordering */
    res = strcmp(x->value, y->value);
  return res;
}

static int mrc_list_cmp(mrc_slist_t x, mrc_slist_t y) {
  int res;
  if (x == y) /* Physical equality */
    res = 0;
  else {
    for(; x && y; x = x->next, y = y->next)
      if ((res = mrc_string_cmp(x->value, y->value))) /* Elements non-equal */
        goto end;
    if (x == NULL) {
      if (y == NULL) /* Structural equality */
        res = 0;
      else /* x is prefix of y */
        res = -1;
    }
    else /* y is prefix of x */
      res = 1;
  }
end: return res;
}
```

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Open research topic!

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- Currently: generalised Quagga RIP implementation
- Result: generalised soft-state, distance vector protocol.

API for generalised RIP

```
metric_t metric_parse(const char*);
size_t metric_print(char*, size_t, metric_t);

metric_t metric_copy(metric_t);
void metric_free(metric_t);

size_t metric_marshal(void*, size_t, metric_t);
metric_t metric_unmarshal(const void*, size_t);

metric_t metric_infinity(void);
metric_t policy_apply(policy_t, metric_t);

int metric_is_better(metric_t, metric_t);
int metric_is_infinity(metric_t);
int metric_is_equal(metric_t, metric_t);
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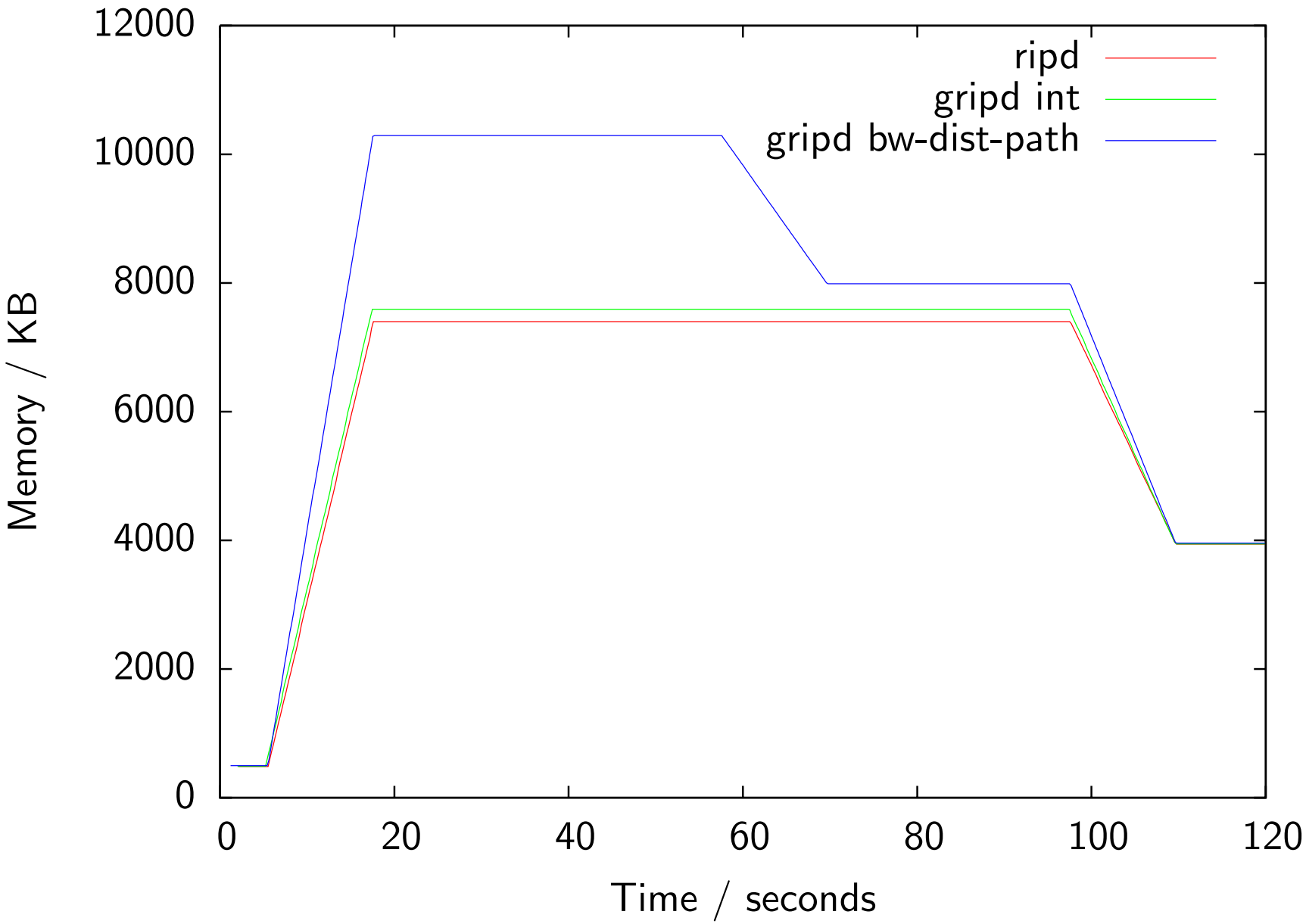
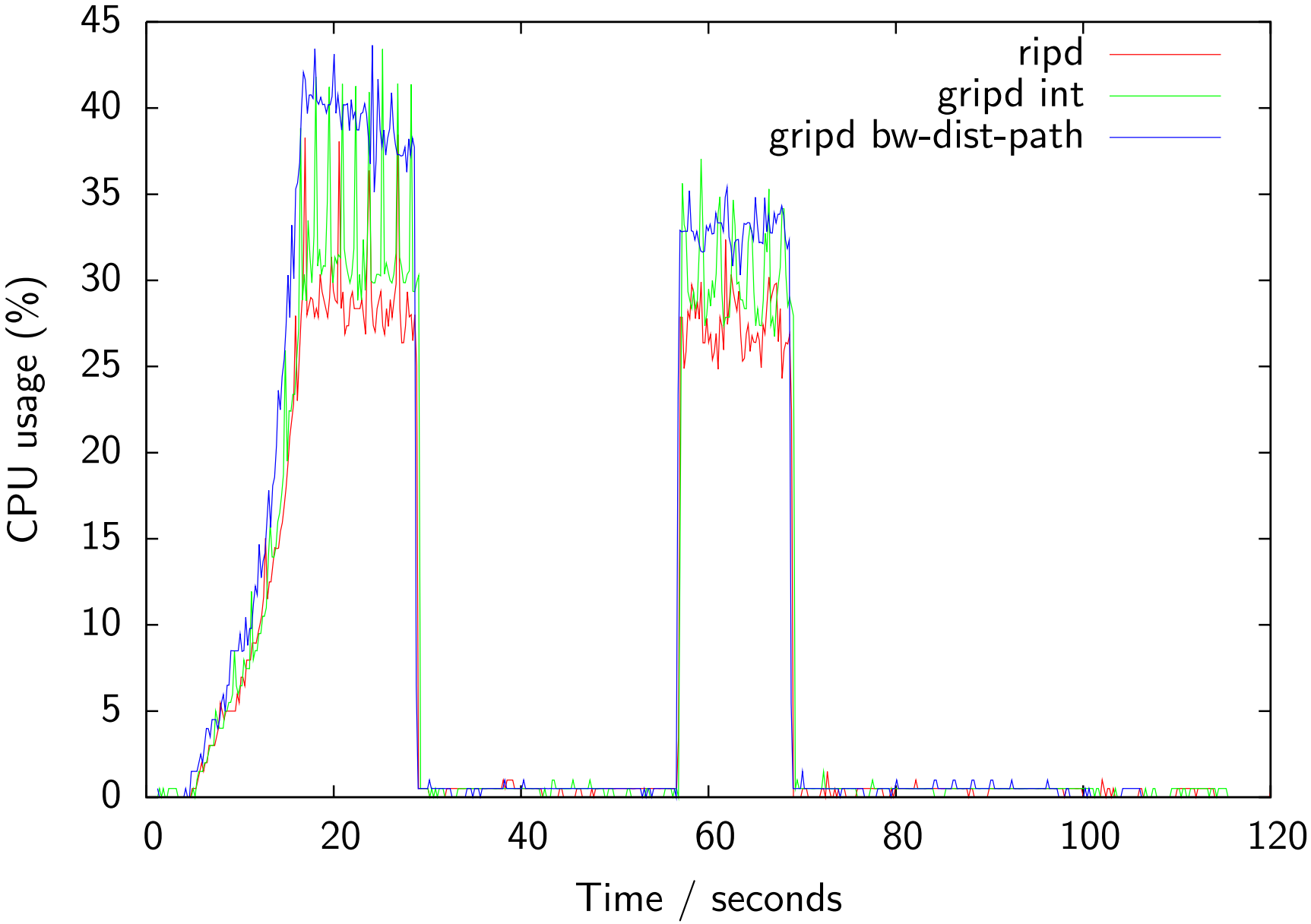
- Goal: tunable tradeoff between time and memory

Performance: memory



Performance: CPU



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- What do you do?

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- Trace from real code running on virtual network
- (Adjust timings, disable triggered updates)

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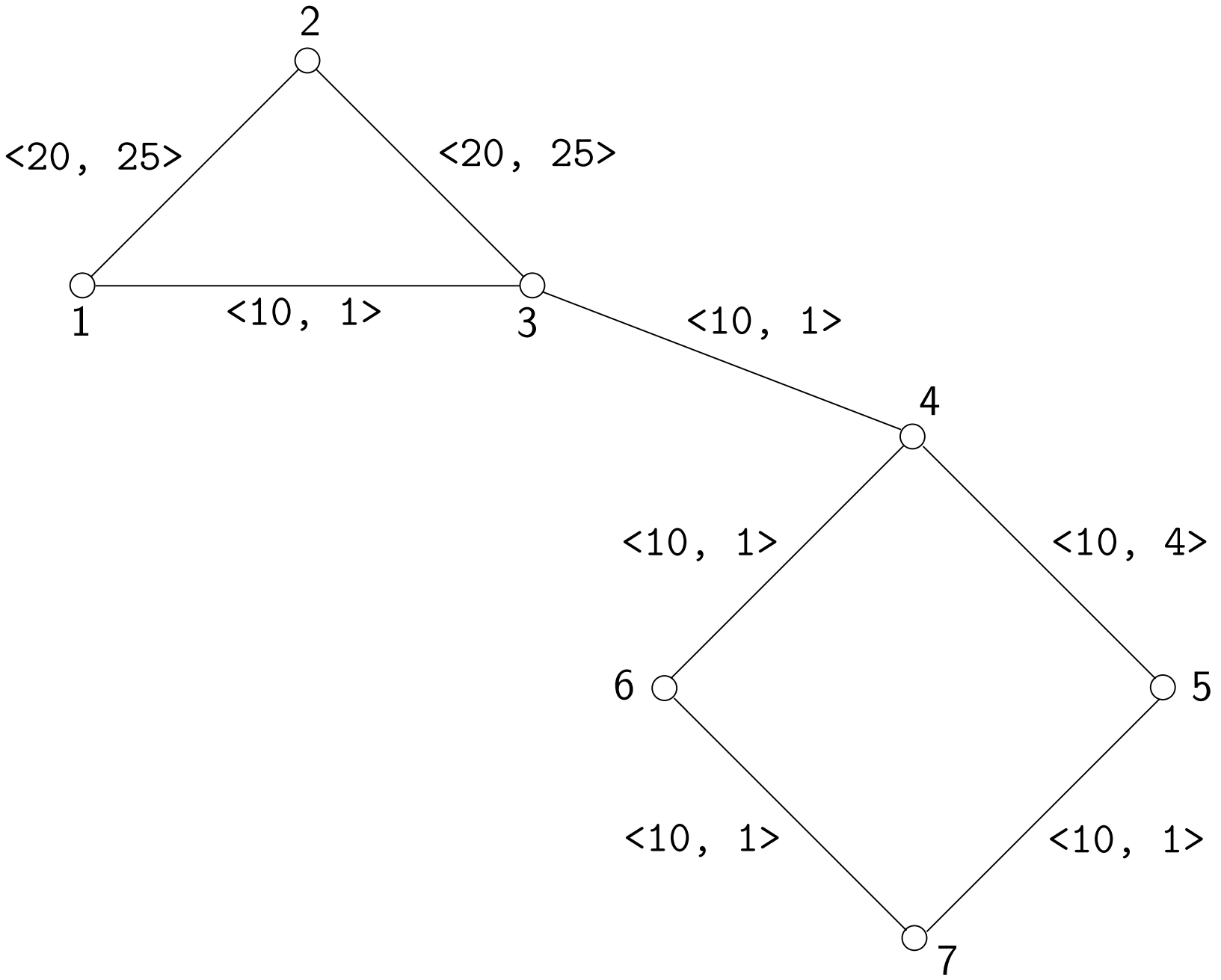

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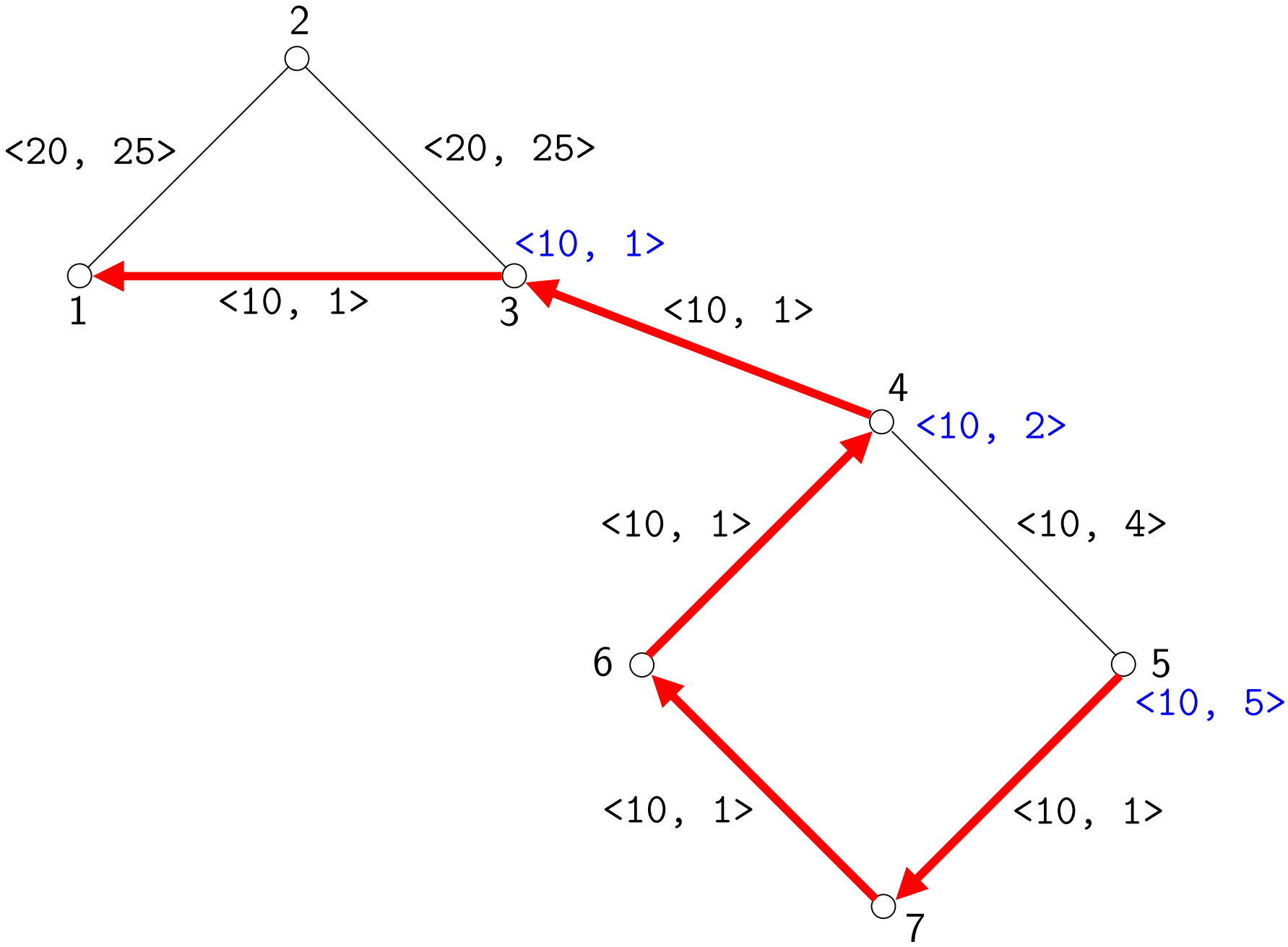
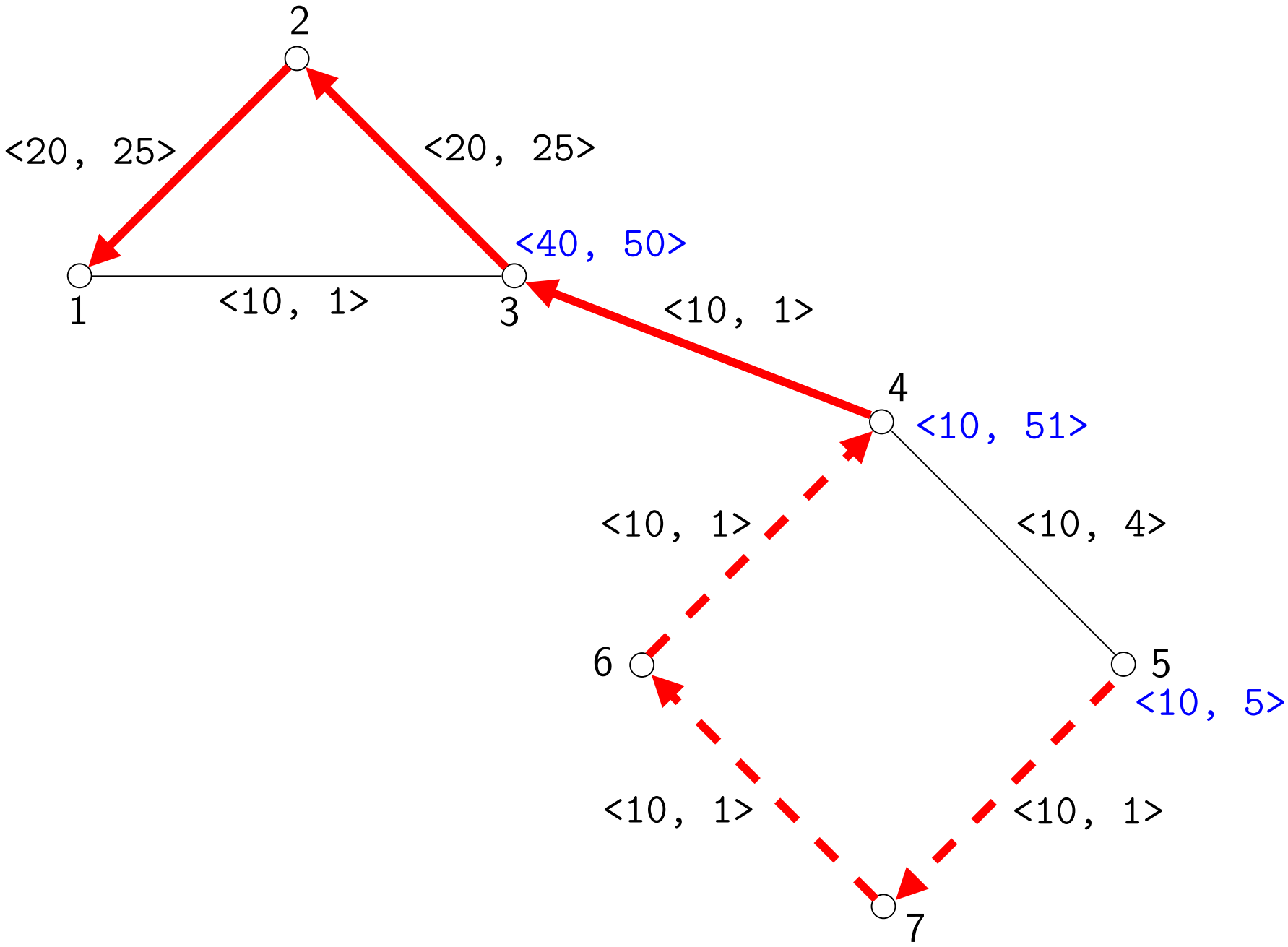
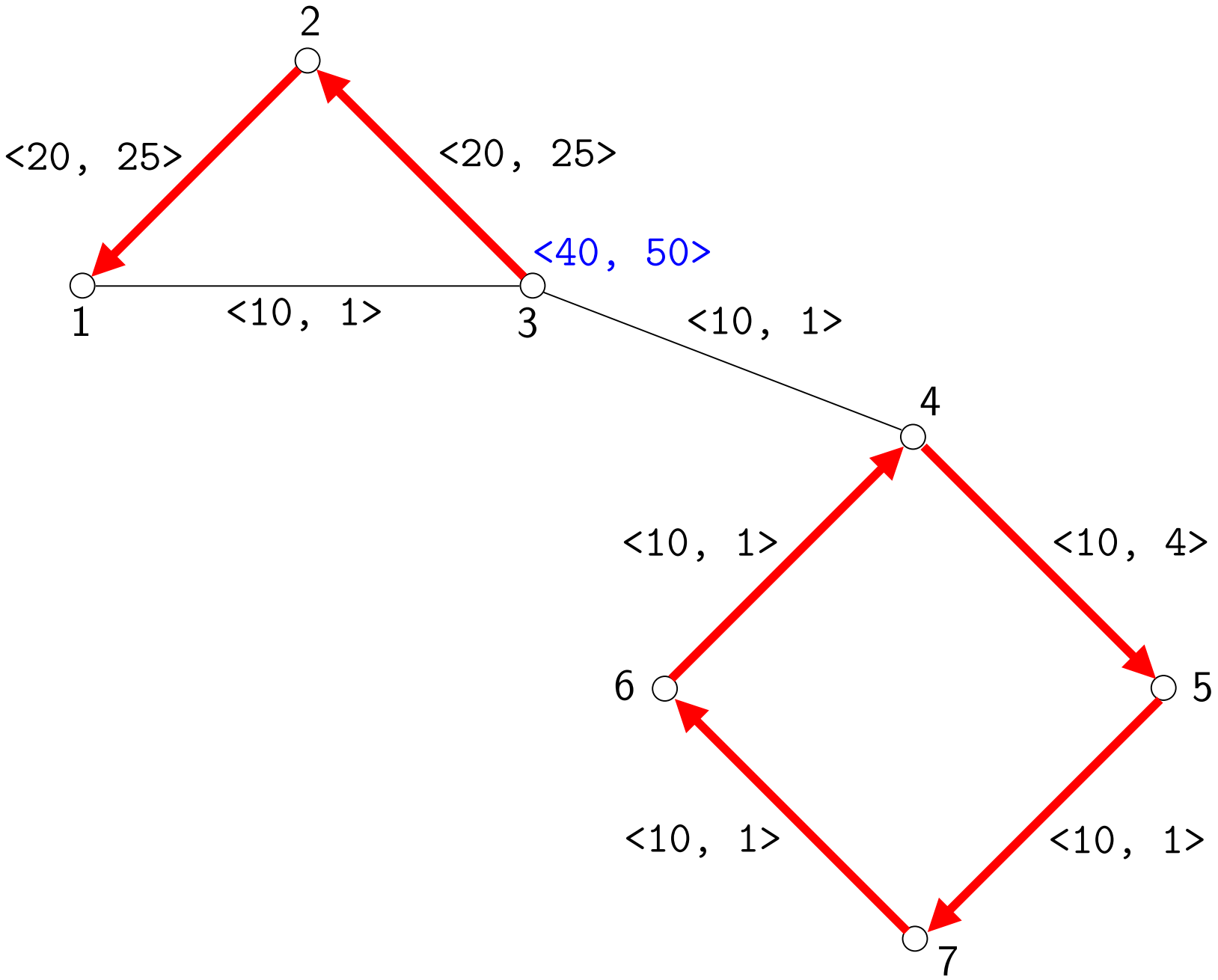


Demonstration: topology (3)



Demonstration: topology (4)



Demonstration: topology (5)