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draft-yossigi-rpkimaxlen-00

The use of maxLength in the RPKI

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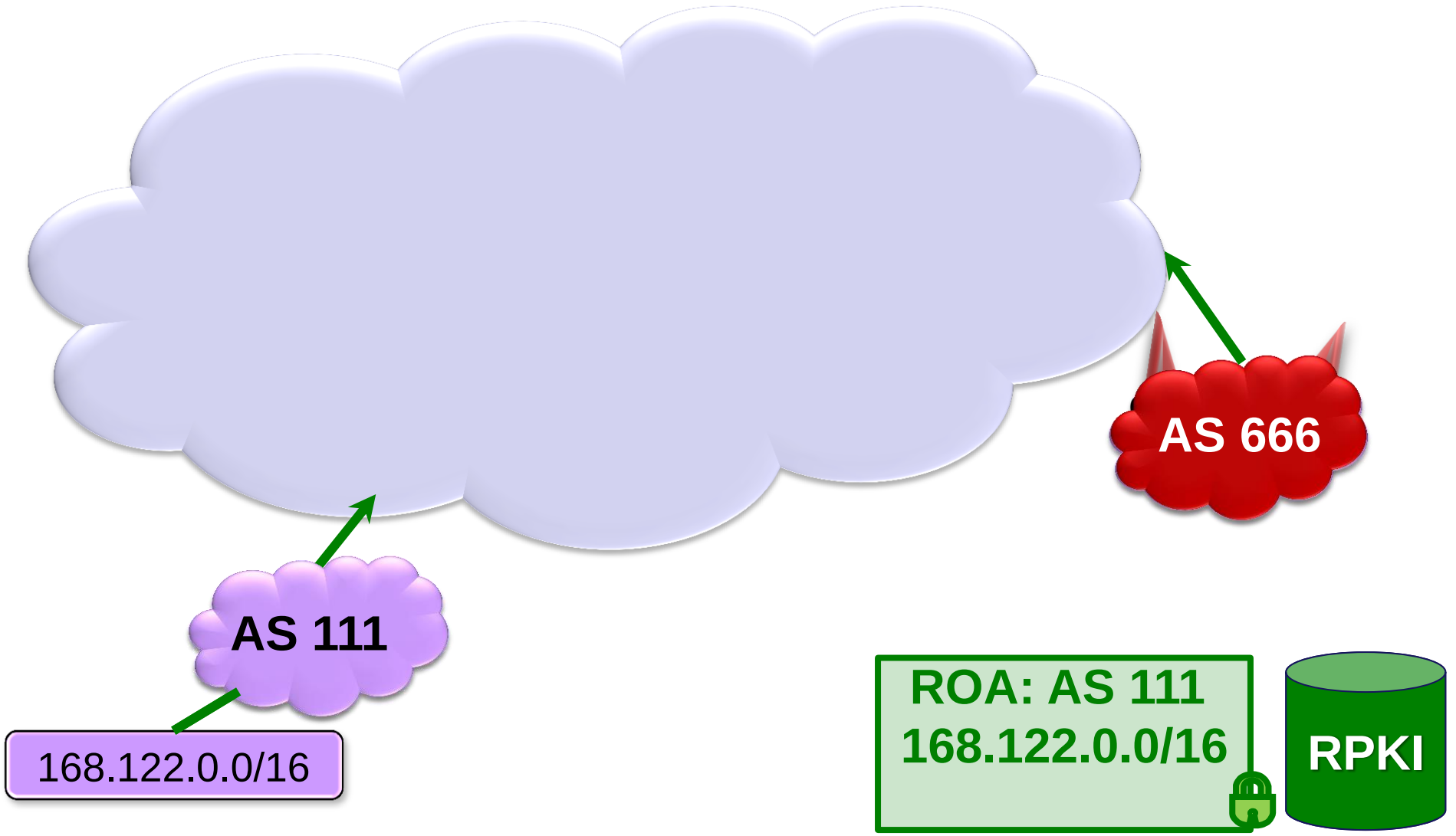
When used properly, the RPKI defeats subprefix hijacks



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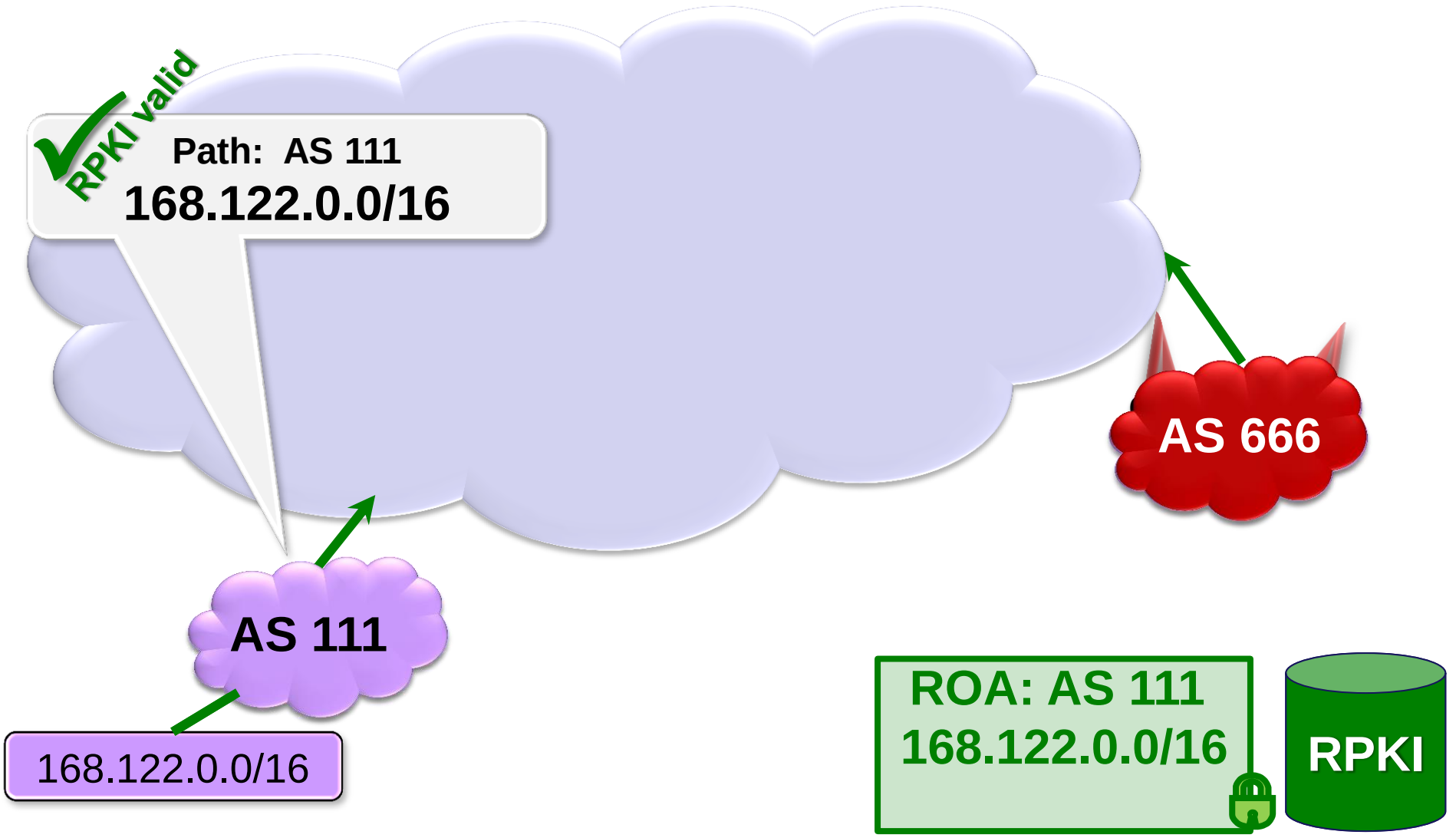

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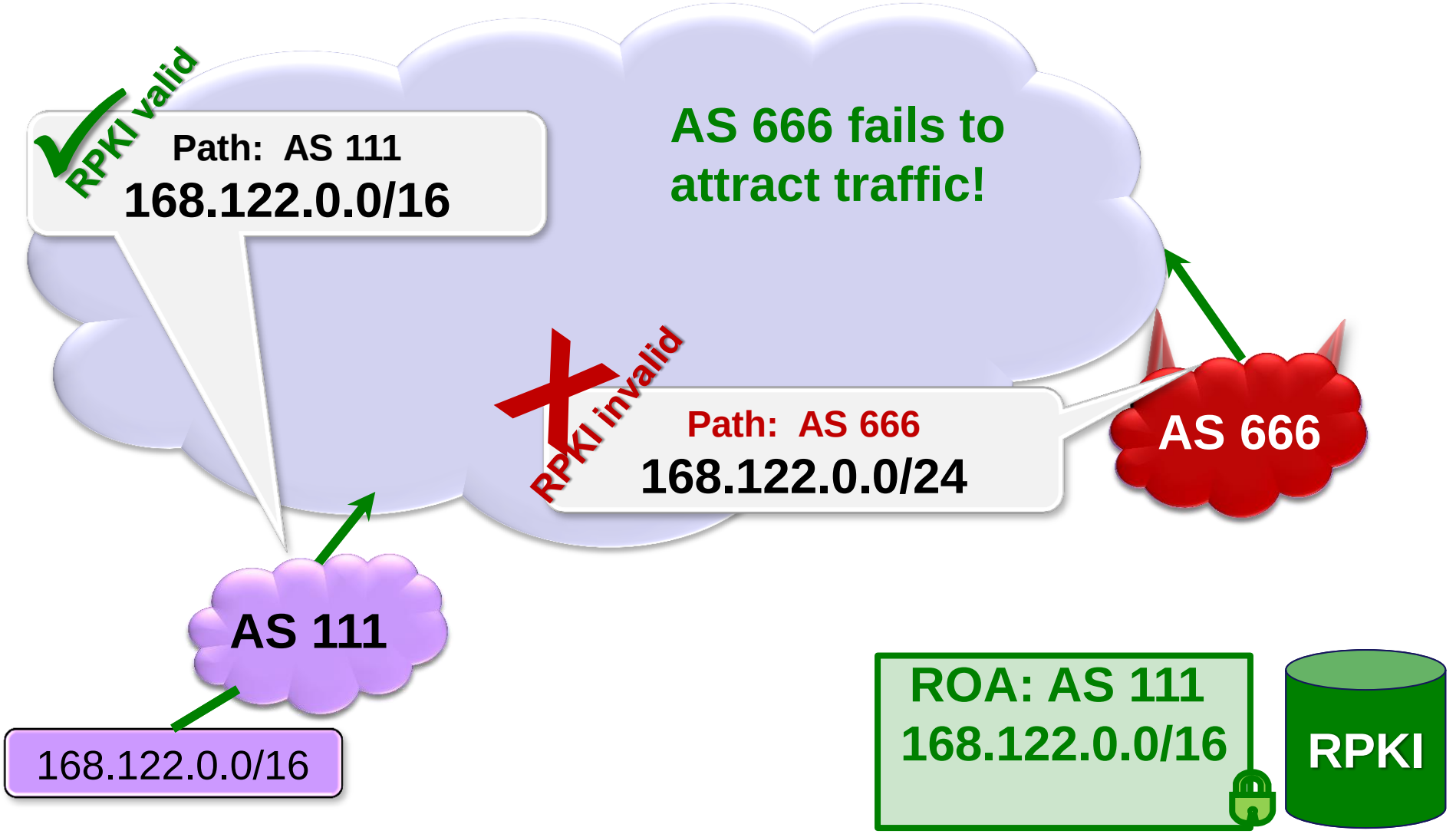
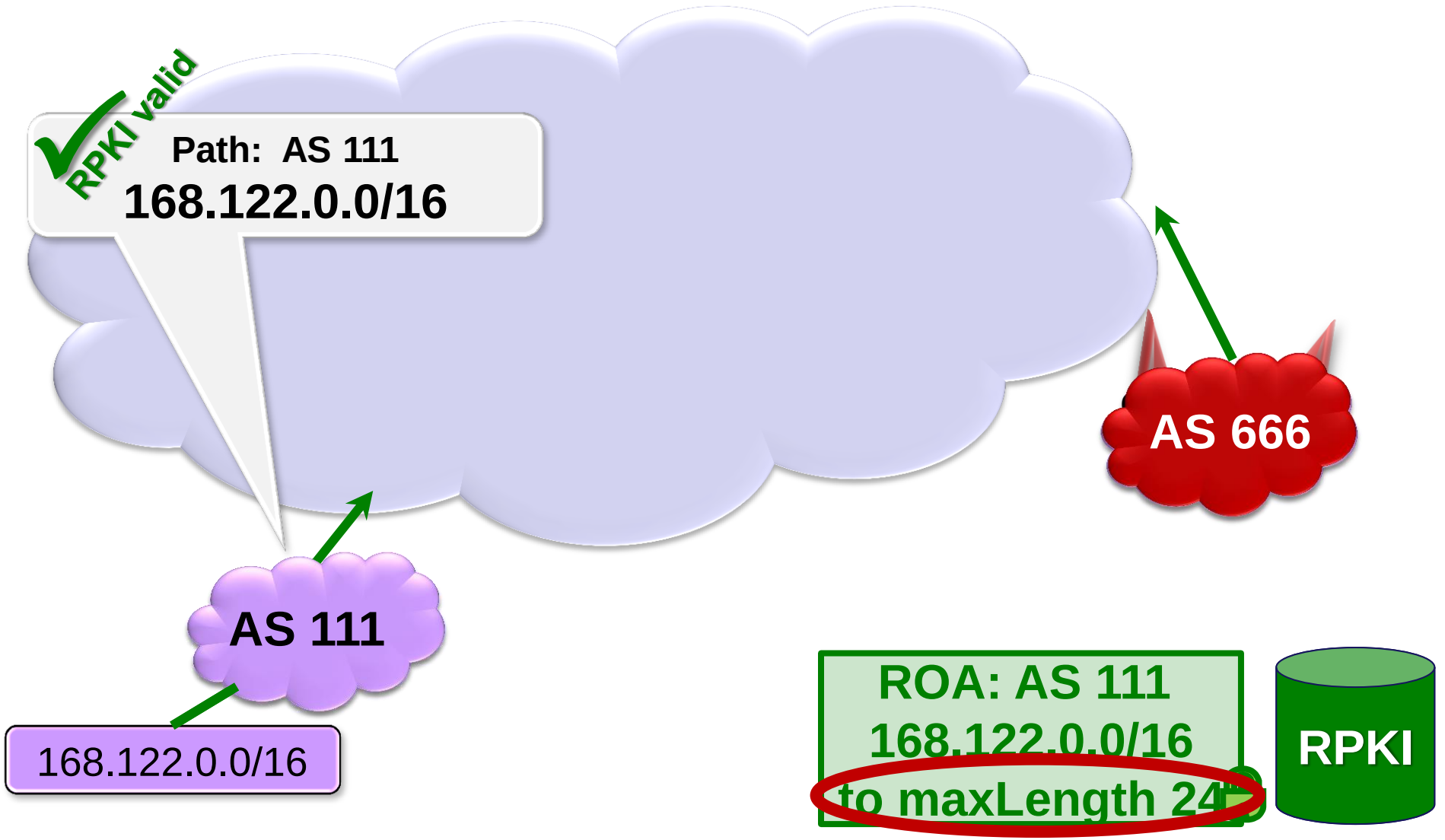


Loose maxlength → forged-origin subprefix hijack



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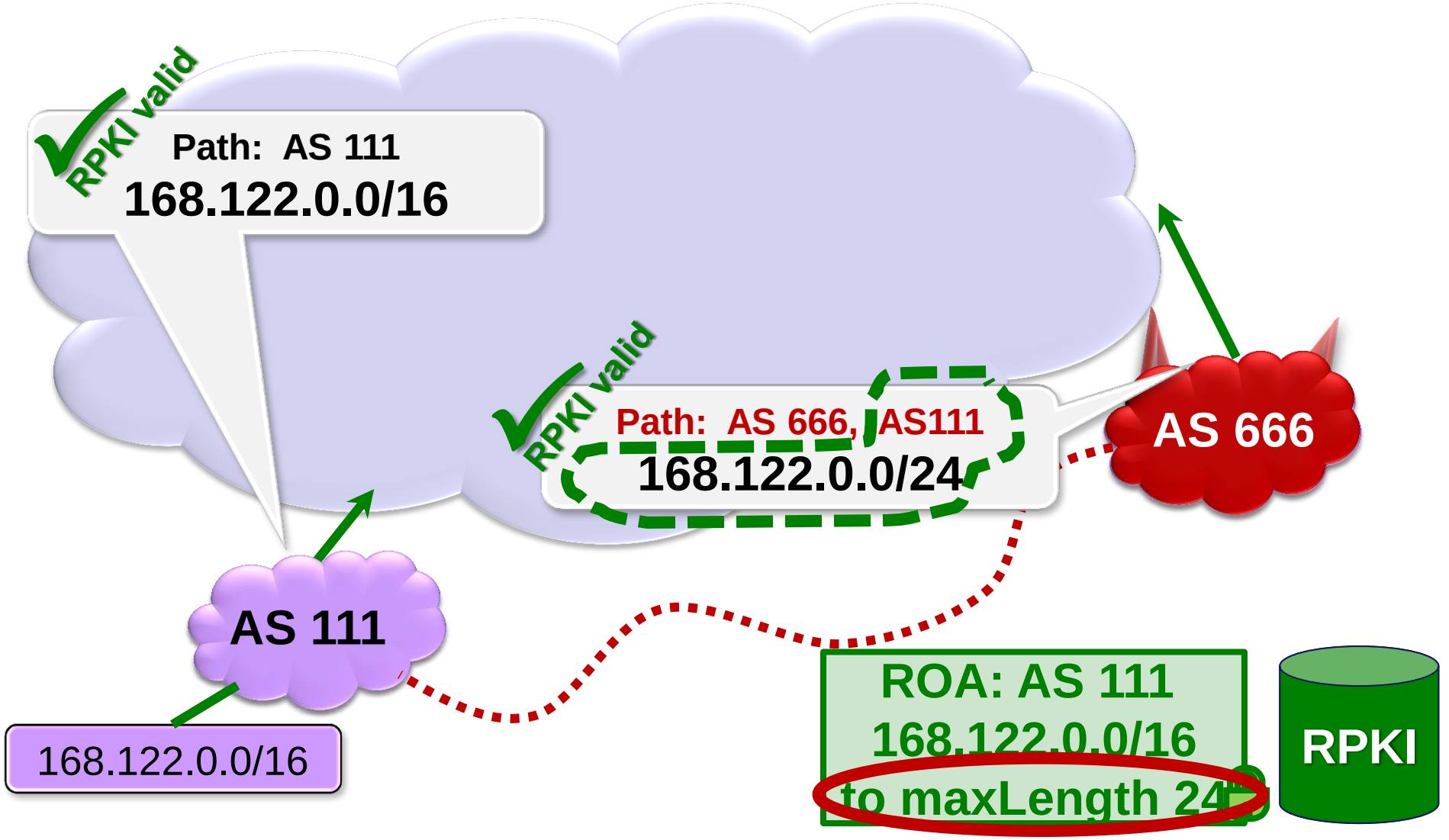

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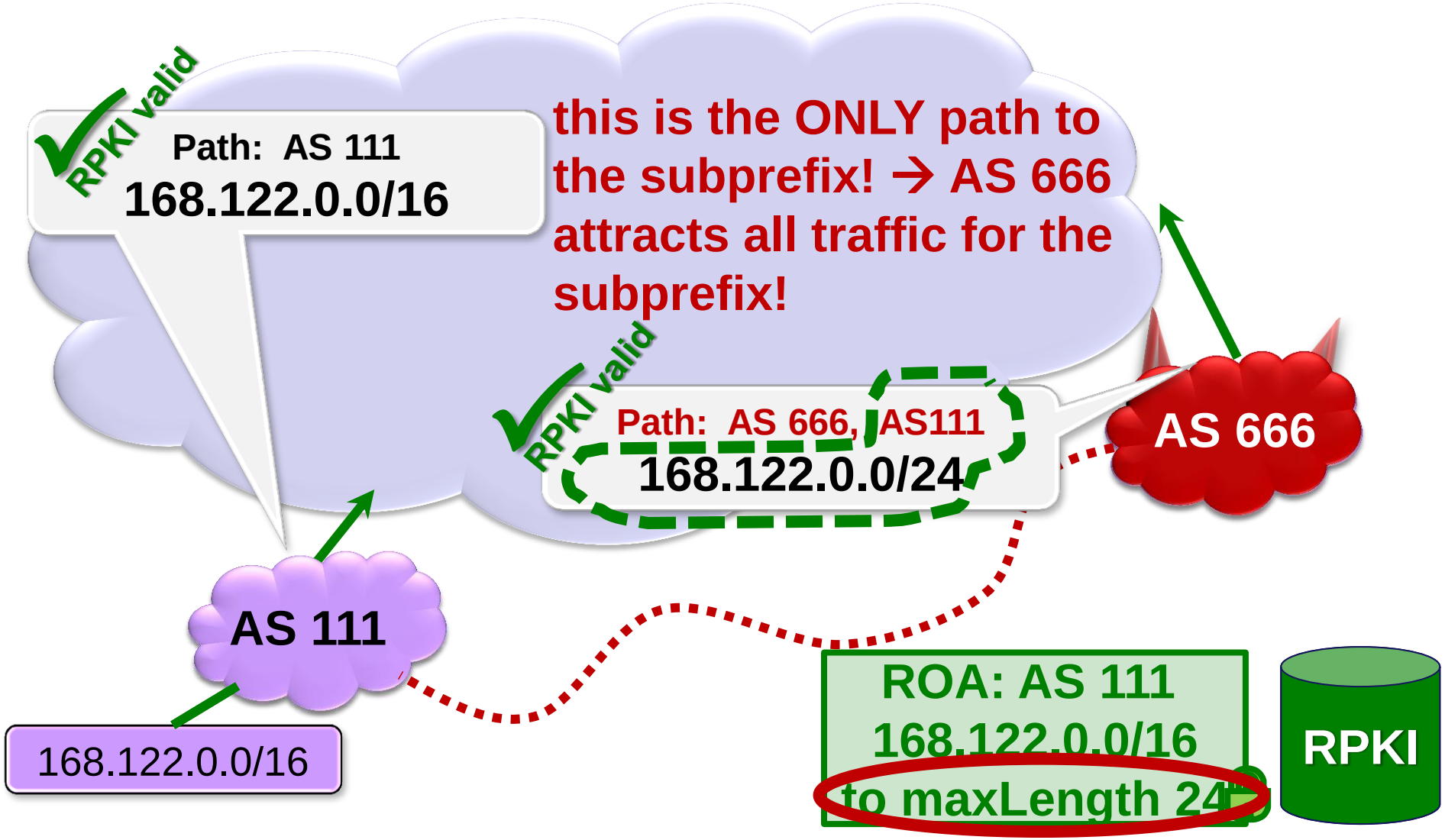

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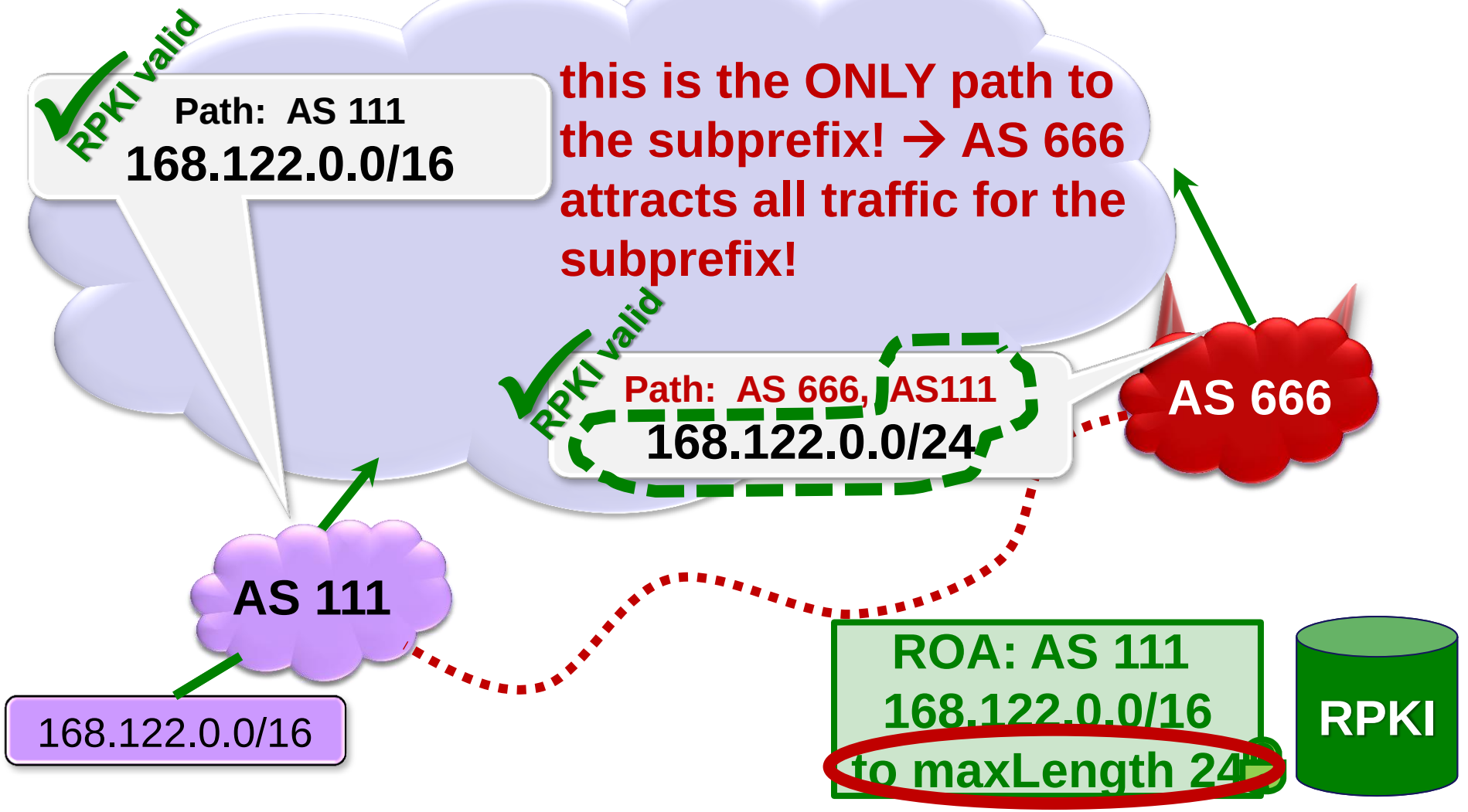
attack is highly effective because 168.122.0.0/24 is unannounced



maxLength misconfigurations are common!

- forged-origin subprefix hijack affects any prefix in ROA where
  - maxlength **m** > prefixlen **p**, unless
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- 16% of the IP prefixes in ROAs have maxlength > prefixlen
- 89% of these are vulnerable to forged-origin subprefix hijacks
  - Even large providers are vulnerable

Recommendations

- As a best common practice:
  - Operators should refrain from using maxlength in ROAs. UIs should convey that.
  - ROAs should instead have explicit **lists** of prefixes authorized to be originated by a single AS
  - Whenever possible, use **minimal** ROAs where each listed prefix is originated in BGP.
- The RPKI already supports this. No extra ROAs needed.

Recommendations

- To reduce the number of RPKI filtering rules, we developed software that RPKI local caches can use to compress lists of prefixes from ROAs back to (AS, prefix, maxlength) tuples

  https://github.com/yossigi/compress_roas

- See our technical report: http://eprint.iacr.org/2016/1015.pdf