DNSSEC Deployment Metrics Research

Moritz Müller

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The Goal

- to perform a survey of academic and industry literature related to the deployment of DNSSEC
- to find and document the different techniques and metrics used to measure all aspects of DNSSEC deployment
- to make recommendations to ICANN org for which metrics to measure to obtain the most comprehensive view of DNSSEC deployment across the Internet [1]

[1] https://www.icann.org/en/system/files/files/rfp-dnssec-deployment-metrics-research-17may21-en.pdf

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Our Approach

1. Study a broad range of research
   - from academia
   - presented at conferences by the industry (RIPE, ICANN DNSSEC workshop, …)
2. Gap analysis with identified metrics
3. Develop assessment framework to assess measurement techniques

Challenge: DNSSEC deployment is a wide field

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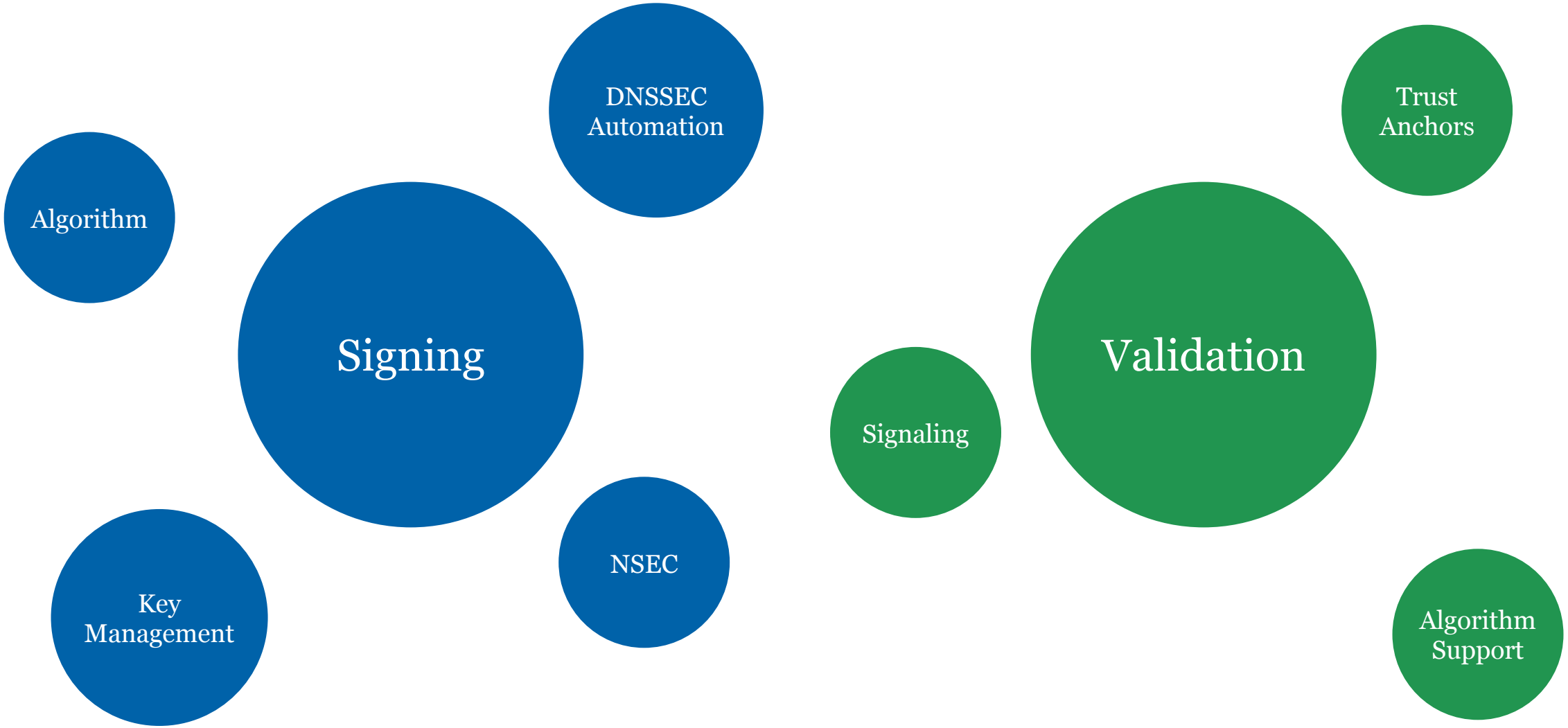

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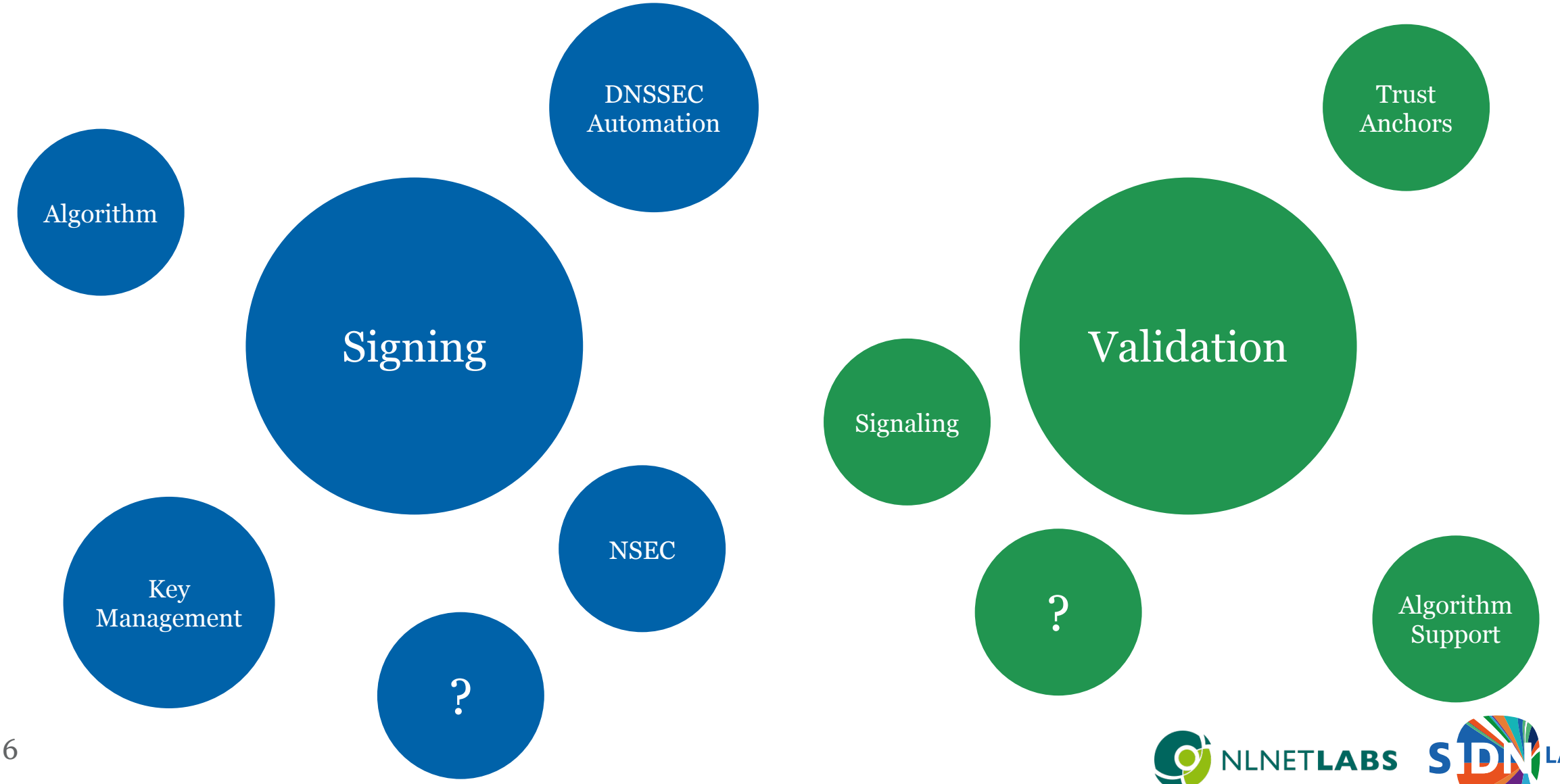

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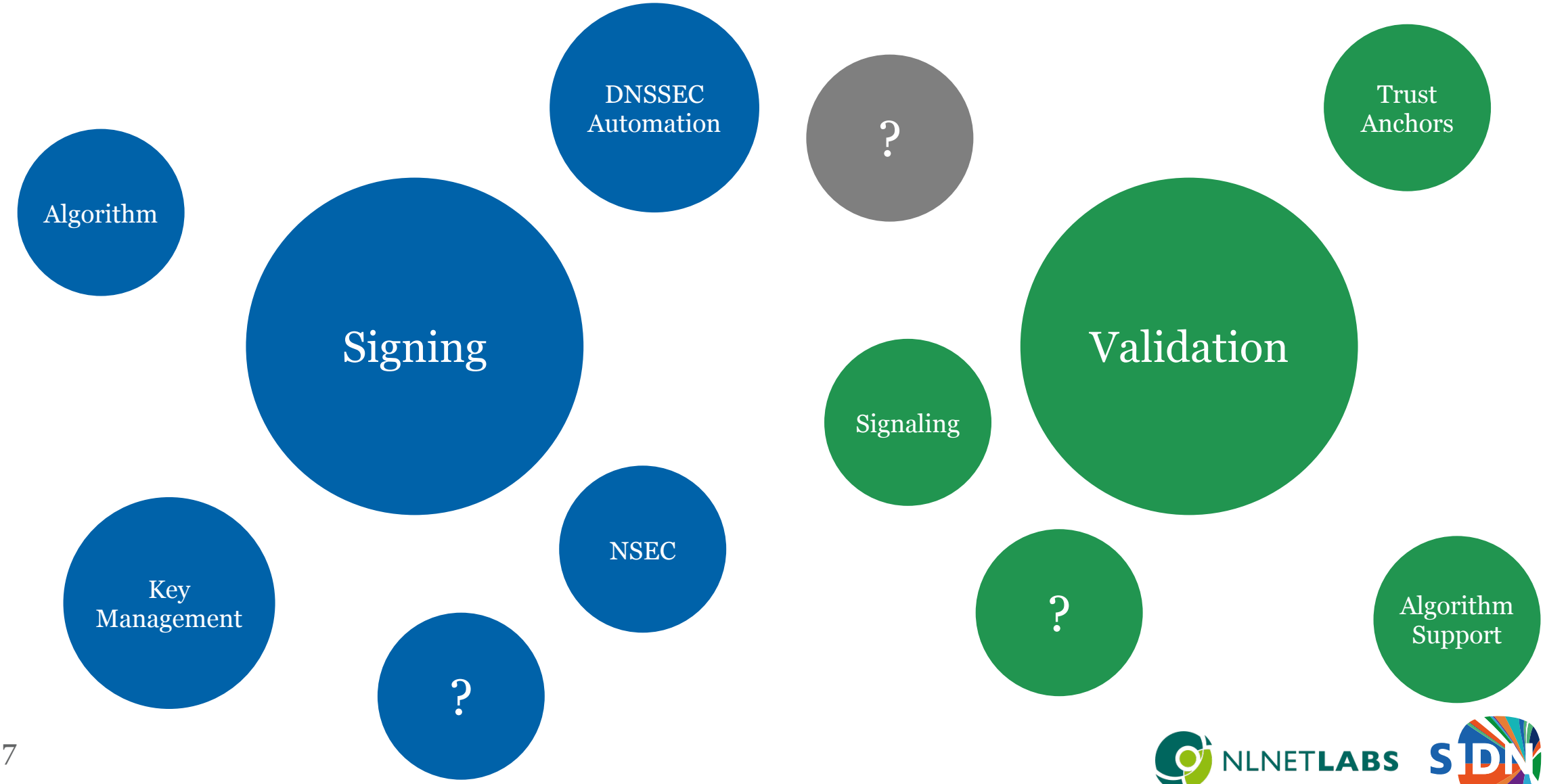

Identified metrics (WIP)

Resolver metrics:

- DNSSEC capability
- DNSSEC validation
- Validation errors
- Transport errors
- Protocol implementation
- Cache spoofing vulnerability
- Trust Anchor
- Negative trust anchor
- Telemetry

Identified metrics (WIP)

Domain Name metrics:

- DNSSEC RR publication
- DNSSEC RR validity
- Transport errors
- Key attributes
- Signature attributes
- Operational metrics
- DANE presence
- Other security RRs
- Domain name attributes
- Name server attributes

Identified metrics (WIP)

- End user metrics: e.g. relies on validating resolver
- DNS Software metrics: e.g. resolver software X supports RFC-5011
- DNS ”eco system” metrics: e.g. registrar Y supports Algorithm 15

Identified measurement techniques

Passive		*vs*		Active
End user	*vs*	Recursive Resolver	*vs*	Authoritative Name Server
Measurement platform		*vs*		“Hack”
Raw		*vs*		Aggregated
Full control		*vs*		Reliant on third party
Transparent		*vs*		Opaque

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Technique Assessment

- Measurement technique has large impact on each metric
- Assess each technique based on:
  - **Coverage** – which parts of the ecosystem can be measured and with what bias?
  - **Reproducibility** – are all measurement parameters known?
  - **Feasibility** – can the measurement run continuously, and does it rely on 3rd parties?
- On a scale from 0 to 4

Metrics in the interest of the community

- Which metrics are most relevant?
- What is the most important aspect, when selecting a measurement technique?
- Which metrics or techniques did we miss?

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moritz.muller@sidn.nl

Any questions?

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