



Making smart discussions between things

M3 Framework: Architecture


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Send Feedback	<p>Do not hesitate to ask for help or give us feedback, advices to improve our tools or documentations, fix bugs and make them more user-friendly and convenient:</p> <p>amelie.gyrard@insight-centre.org</p>
Google Group	<p>https://groups.google.com/d/forum/m3-semantic-web-of-things</p> <p>(Not really active yet)</p>
Last updated	<p>June 2016</p> <ul style="list-style-type: none"> • Methodology • Functional architecture • Architecture layer • Operational workflow • Semantic-based Architecture for ETSI M2M • Semantic-based Architecture for oneM2M • Architecture technologies used for the prototype • SEG 3.0 methodology (extension of M3)
Created	June 2016
Status	 Work in progress
Goal	<p>This documentation enables understanding the architecture of the M3 framework. Architecture following standardizations OneM2M and ETSI M2M.</p> <p>This document mainly comprises the pictures, references are given describing better the pictures.</p>

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Terms and acronyms

IoT	Internet of Things (IoT)
M3 framework	Machine-to-Machine Measurement (M3) framework

I. Architecture Citations

Please do not forget to cite our work:

1. ETSI M2M Architecture

- A machine-to-machine architecture to merge semantic sensor measurements
WWW 2013, 22nd International World Wide Web Conference, Doctoral Consortium, May 13-17, 2013, Rio de Janeiro, Brazil. Amelie Gyrard, Christian Bonnet and Karima Boudaoud
- An architecture to aggregate heterogeneous and semantic sensed data
ESWC 2013, 10th Extended Semantic Web Conference, PhD Symposium, May 26-30, 2013, Montpellier, France
Amelie Gyrard, Christian Bonnet and Karima Boudaoud

2. OneM2M architecture

- Integrating Machine-to-Machine Measurement Framework into oneM2M Architecture
17th Asian-Pacific Network Operations and Management Symposium (APNOMS 2015), 19-21 August 2015, Busan, Korea
Amelie Gyrard, Soumya Kanti Datta, Christian Bonnet, Karima Boudaoud

3. M3 framework Architecture

- Standardizing Generic Cross-Domain Applications in Internet of Things
Third Workshop on Telecommunications Standards, Part of IEEE Globecom 2014, Austin, TX, USA, 8-12 December 2014. Amelie Gyrard, Soumya Kanti Datta, Christian Bonnet and Karima Boudaoud (M3 framework Architecture)

II. M3 functional framework

More information can be found in [5].

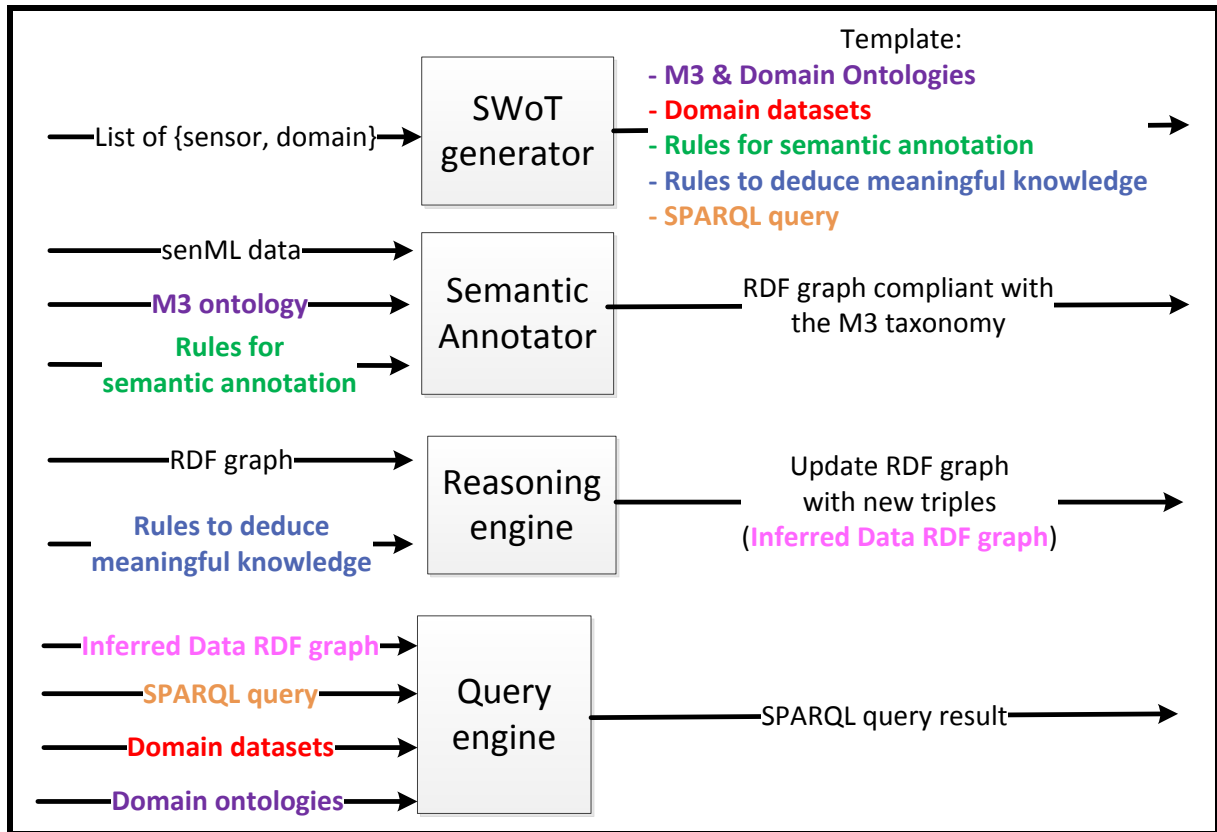


Figure 1. M3 functional framework

III. M3 Architecture layer

More information can be found in [4].

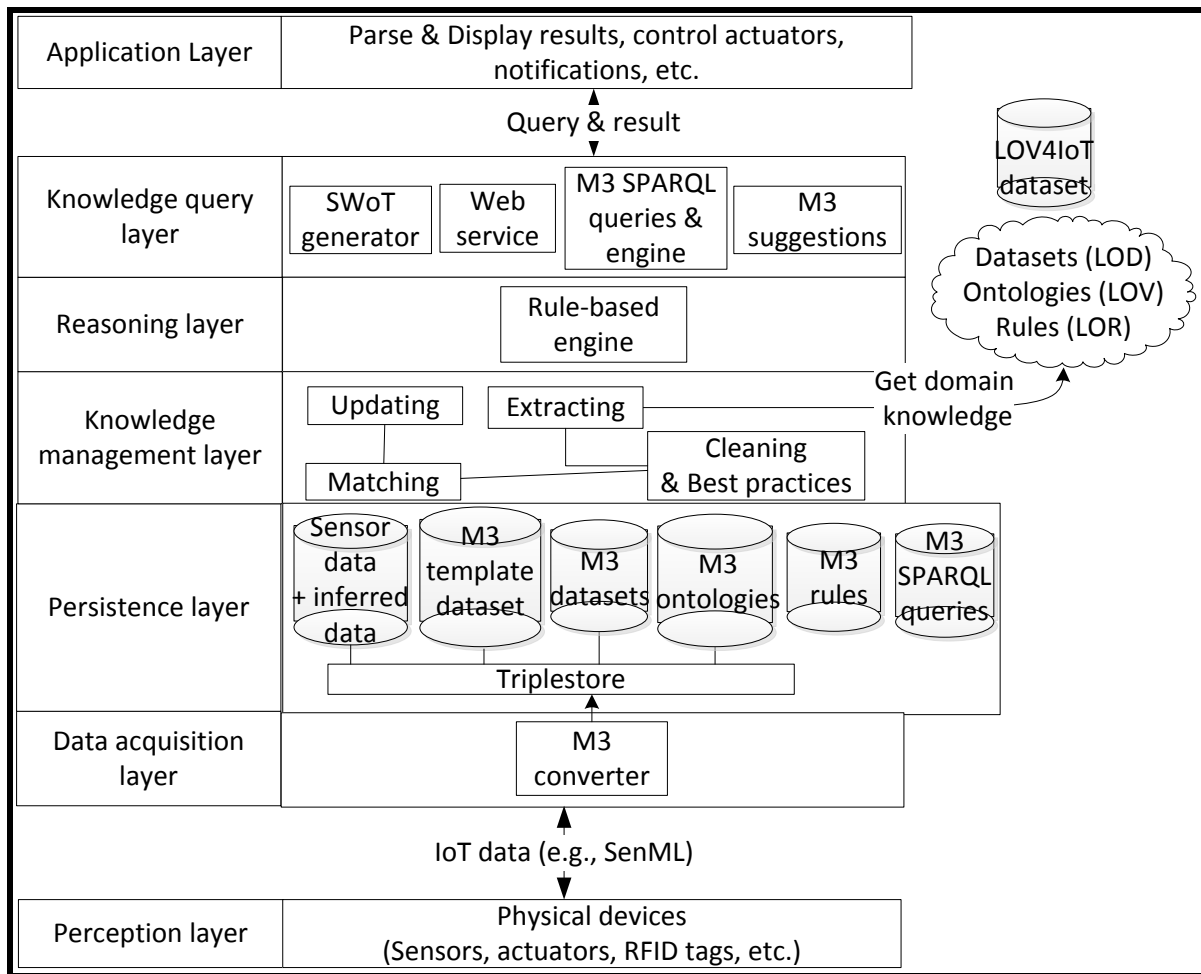


Figure 2. M3 architecture

IV. M3 operational workflow

More information can be found in [3].

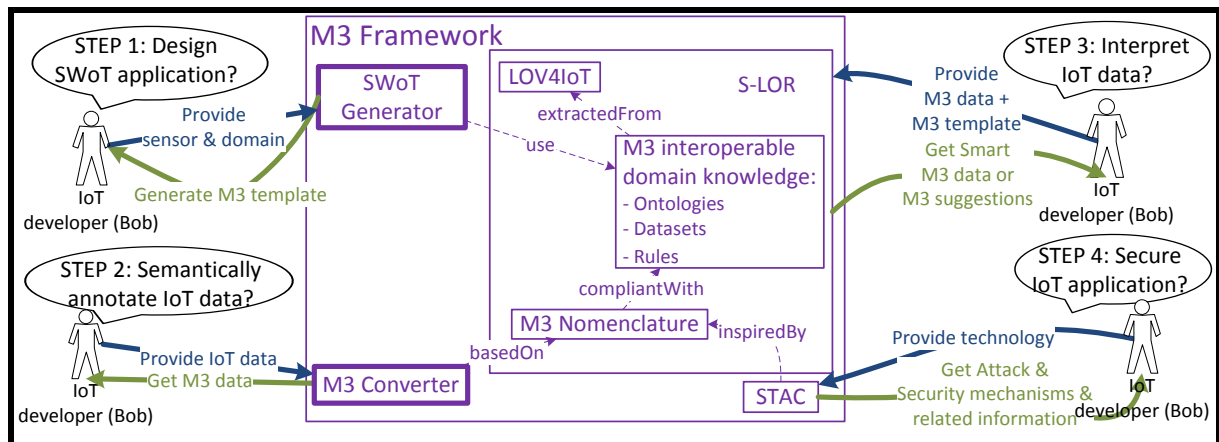


Figure 3. M3 operational workflow.

V. Conceptual framework

More information can be found in [5].

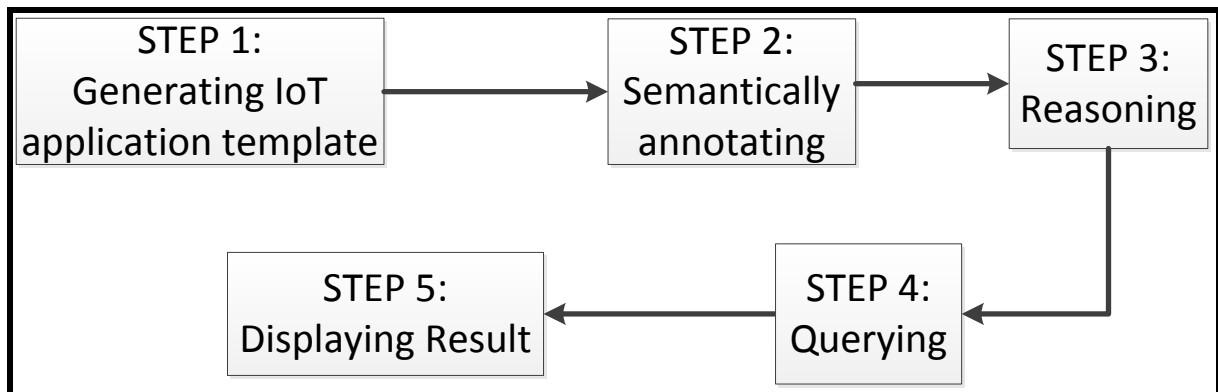


Figure 4. M3 conceptual framework

Extension of this work:

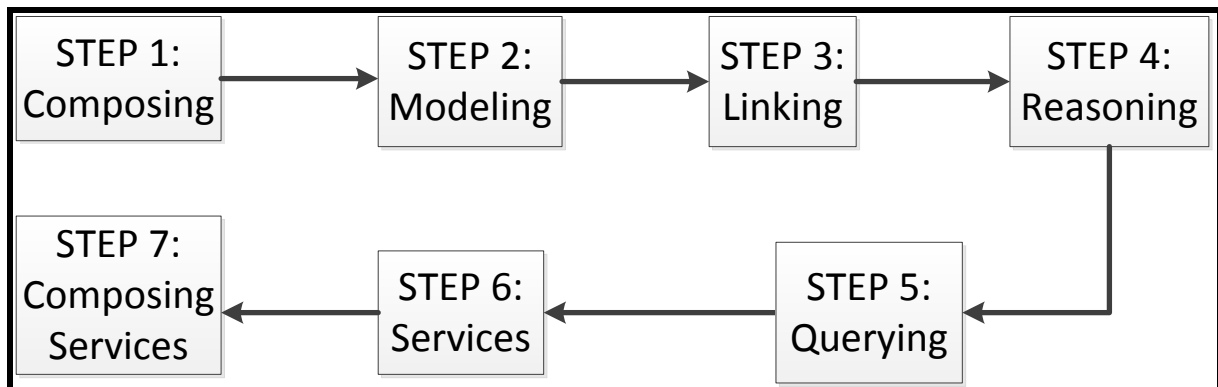


Figure 5 SEG 3.0 Conceptual framework (extension of M3)

VI. Architecture for Technologies used within M3

More information can be found in [3].

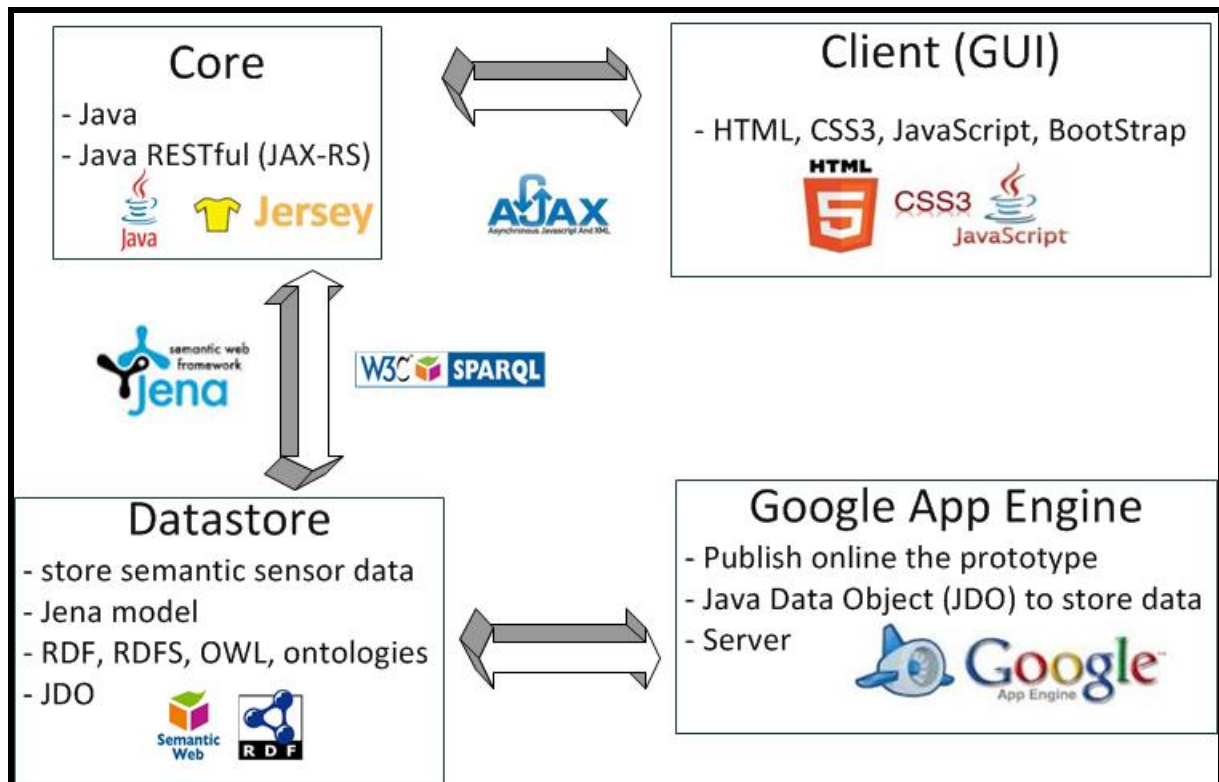


Figure 6. Technologies used within M3 prototype

VII. M3 architecture for ETSI M2M

This architecture has been inspired by the ETSI M2M architecture that we enrich with semantic web technologies. More information can be found in [2]:

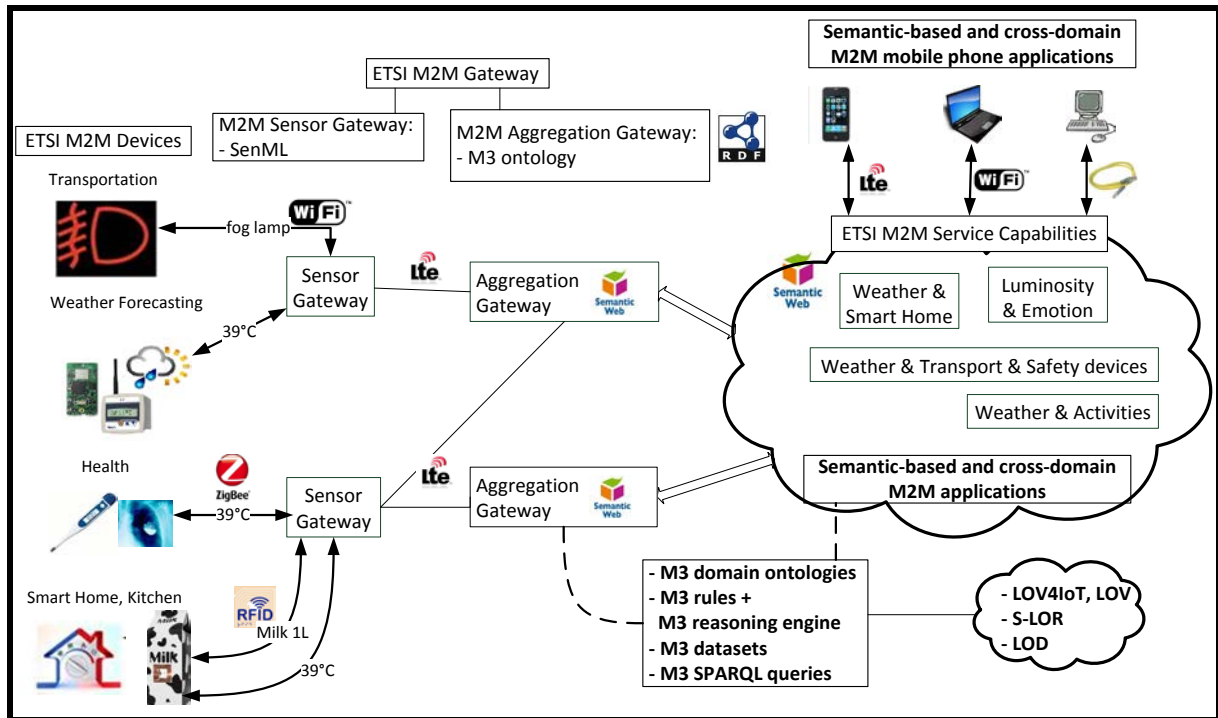


Figure 7. Integrating semantic web within ETSI M2M Architecture

VIII. M3 architecture for OneM2M

More information can be found in [1]

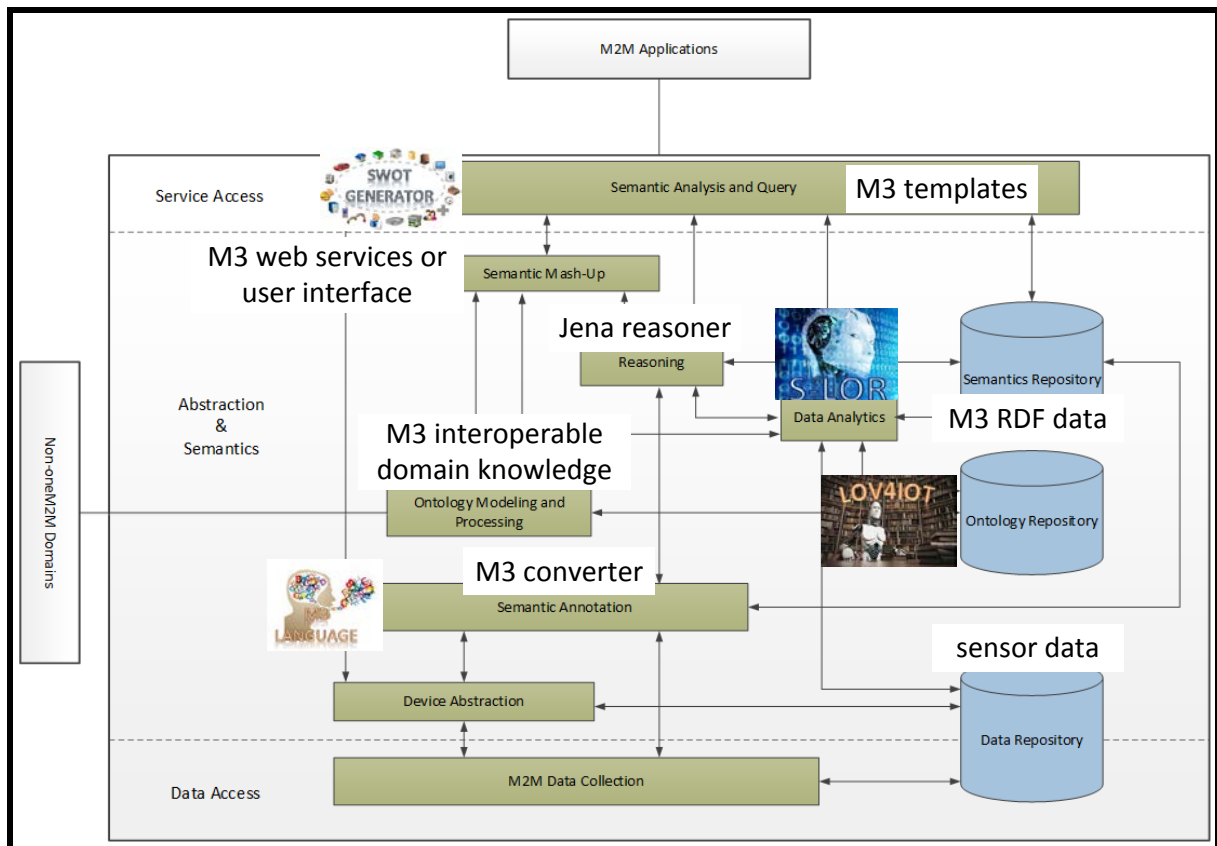


Figure 8. M3 architecture for OneM2M

IX. SEG 3.0: Extension of M3

More information can be found in [5].

1. SEG 3.0 Methodology

More information can be found in [5].

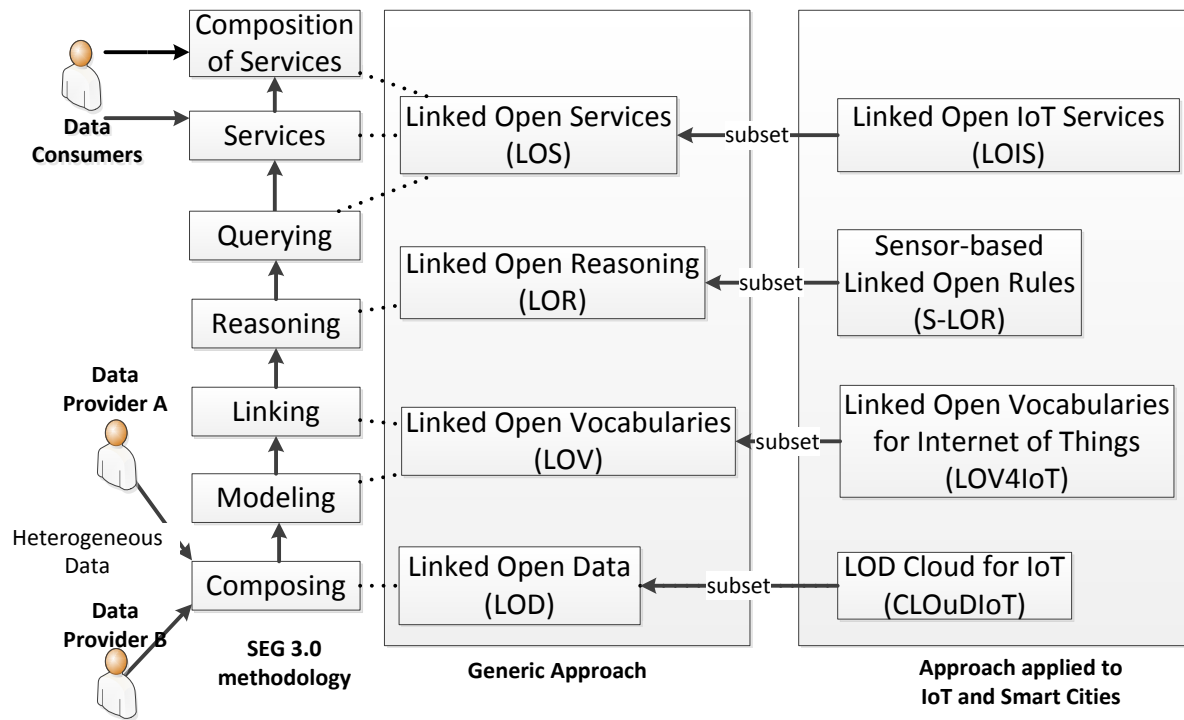


Figure 9. Methodology to enrich sensor data [5]

2. SEG 3.0 Conceptual framework

More information can be found in [5].

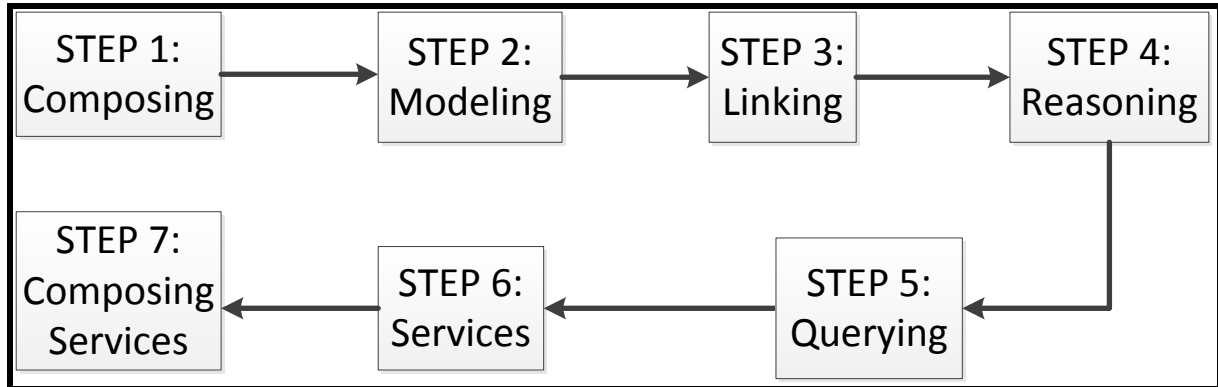


Figure 10 SEG 3.0 Conceptual framework (extension of M3) [5]

3. SEG 3.0 functional framework

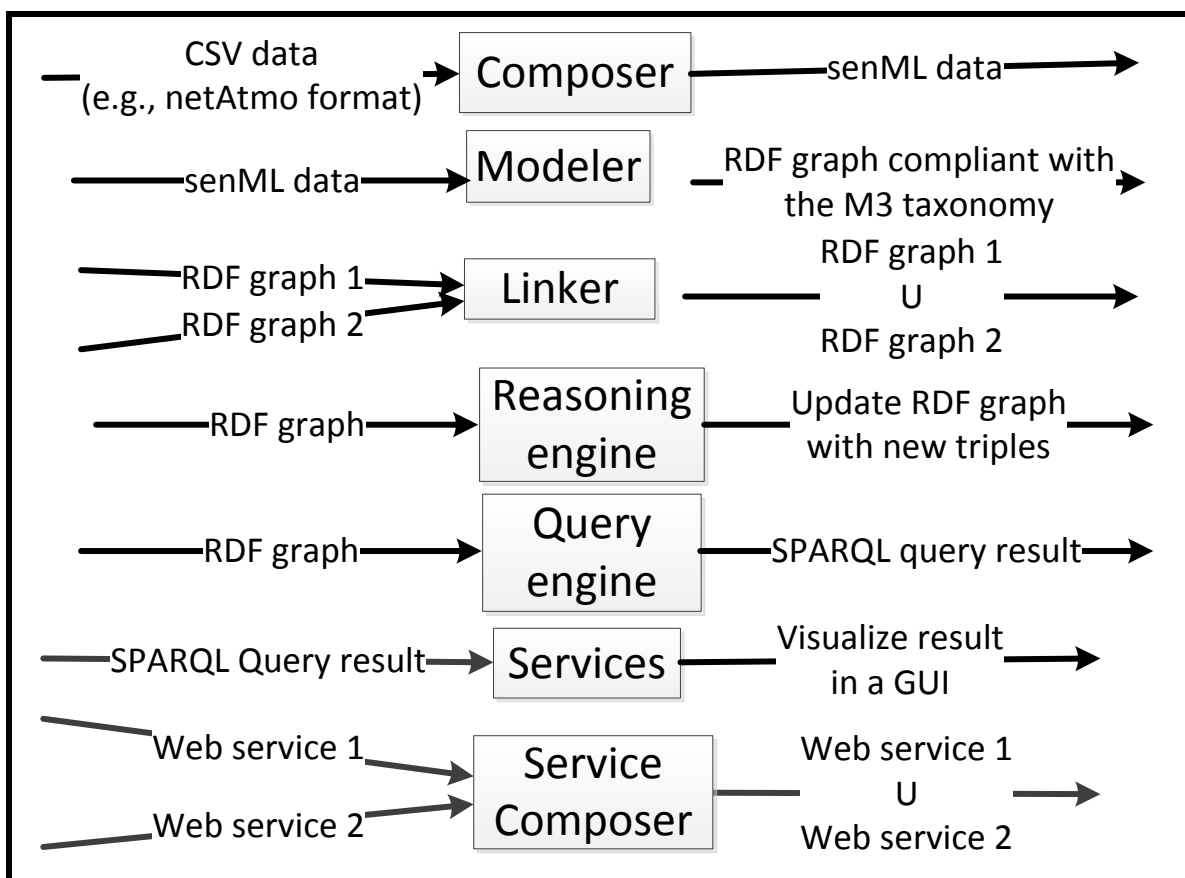


Figure 11. SEG 3.0 Functional framework (extension of M3) [5]

X. References

- [1] A. Gyrard, S. K. Datta, C. Bonnet, and K. Boudaoud. Integrating machine-to-machine measurement framework into onem2m architecture. In *Network Operations and Management Symposium (APNOMS), 2015 17th Asia-Pacific*, pages 364–367, Aug 2015.
- [2] Amelie Gyrard. A machine-to-machine architecture to merge semantic sensor measurements. In *Proceedings of the 22nd international conference on World Wide Web companion*, pages 371–376. International World Wide Web Conferences Steering Committee, 2013.
- [3] Amélie Gyrard. *Designing Cross-Domain Semantic Web of Things Applications*. PhD thesis, Thesis, 04 2015.
- [4] Amélie Gyrard, Soumya Kanti Datta, Christian Bonnet, and Karima Boudaoud. Standardizing generic cross-domain applications in Internet of Things. In *GLOBECOM 2014, 3rd IEEE Workshop on Telecommunication Standards: From Research to Standards, December 8, 2014, Austin, Texas, USA, Austin, UNITED STATES*, 12 2014.
- [5] Amelie Gyrard and Martin Serrano. Connected smart cities: Interoperability with seg 3.0 for the internet of things. In *30th IEEE International Conference on Advanced Information Networking and Applications Workshops, 2016, Crans-Montana, Switzerland.*, 2016.