

The background features a large, complex network graph on the left side, composed of numerous nodes and edges. On the right side, there is a smaller, stylized network graph with several nodes of varying sizes connected by lines. The overall aesthetic is clean and technical, with a light gray background.

Industry-proven AI applications based on an Enterprise Knowledge Graph

Jan Weerts + Klaus Reichenberger – Semantics 2019



Semantics is the greatest technology ever

Why is it so difficult to introduce in the enterprise?

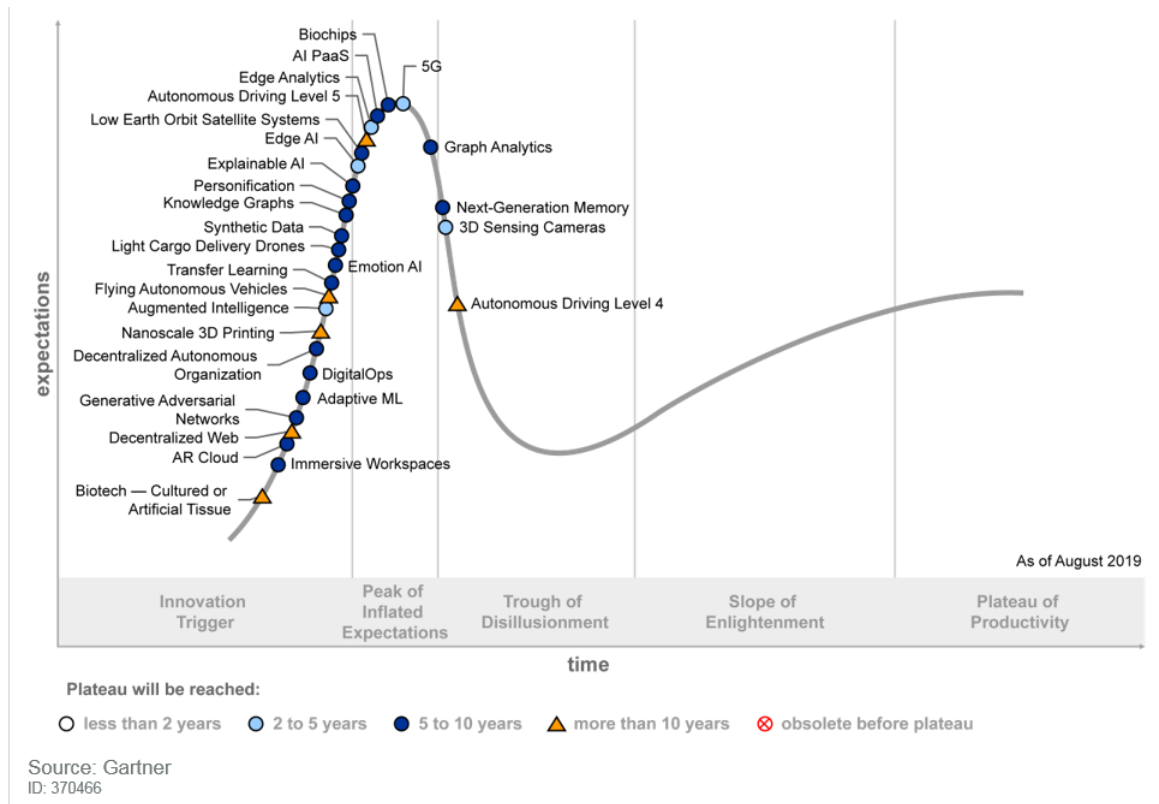
- Experimental applications dominate
- Internal, backend usage, not exposed to the users, not managed by domain experts
- **How do we escape the sandbox?**





Does the Knowledge Graph help?

Gartner Hype Cycle for Artificial Intelligence, 2019



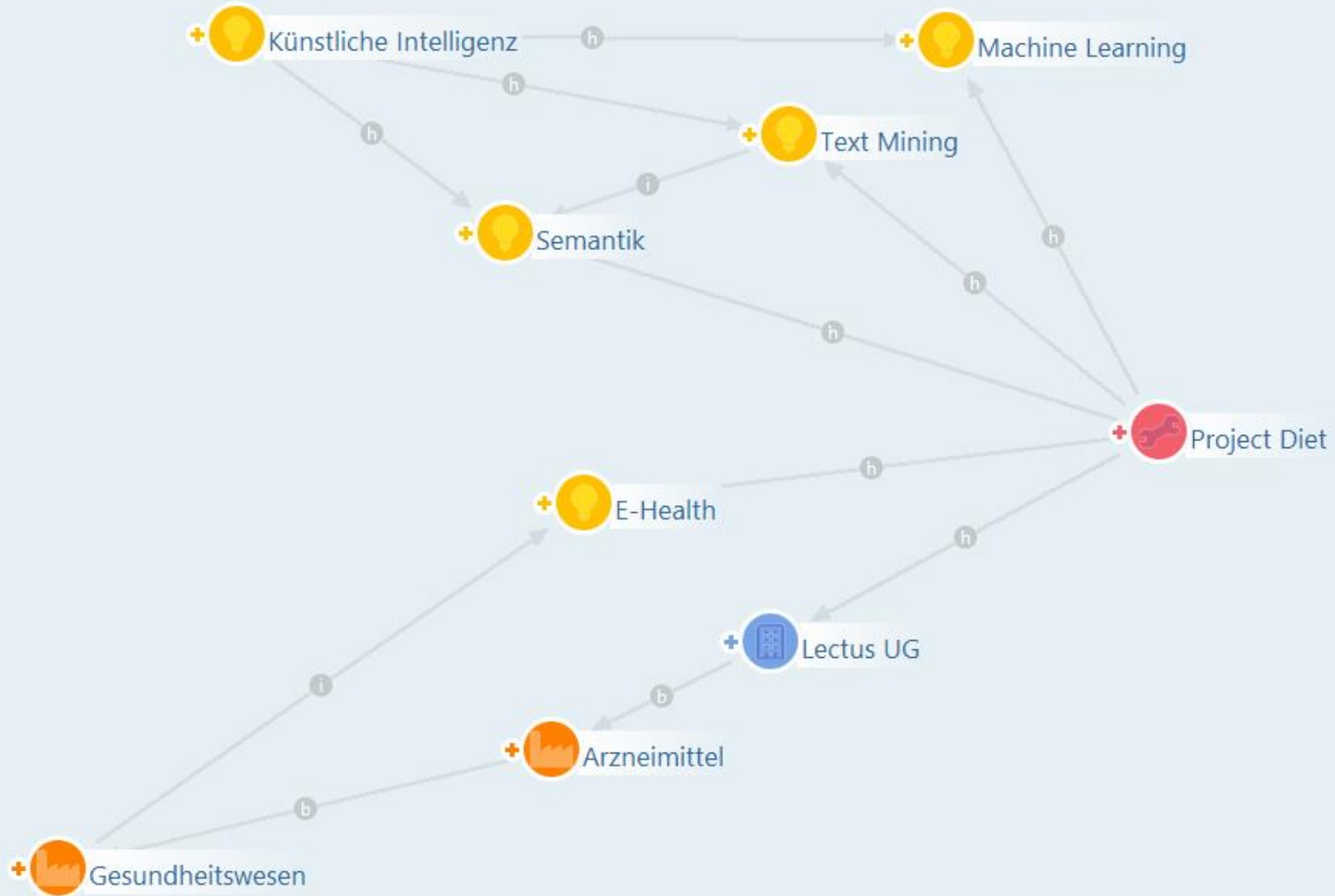
Old wine in new bottles?

New approach?

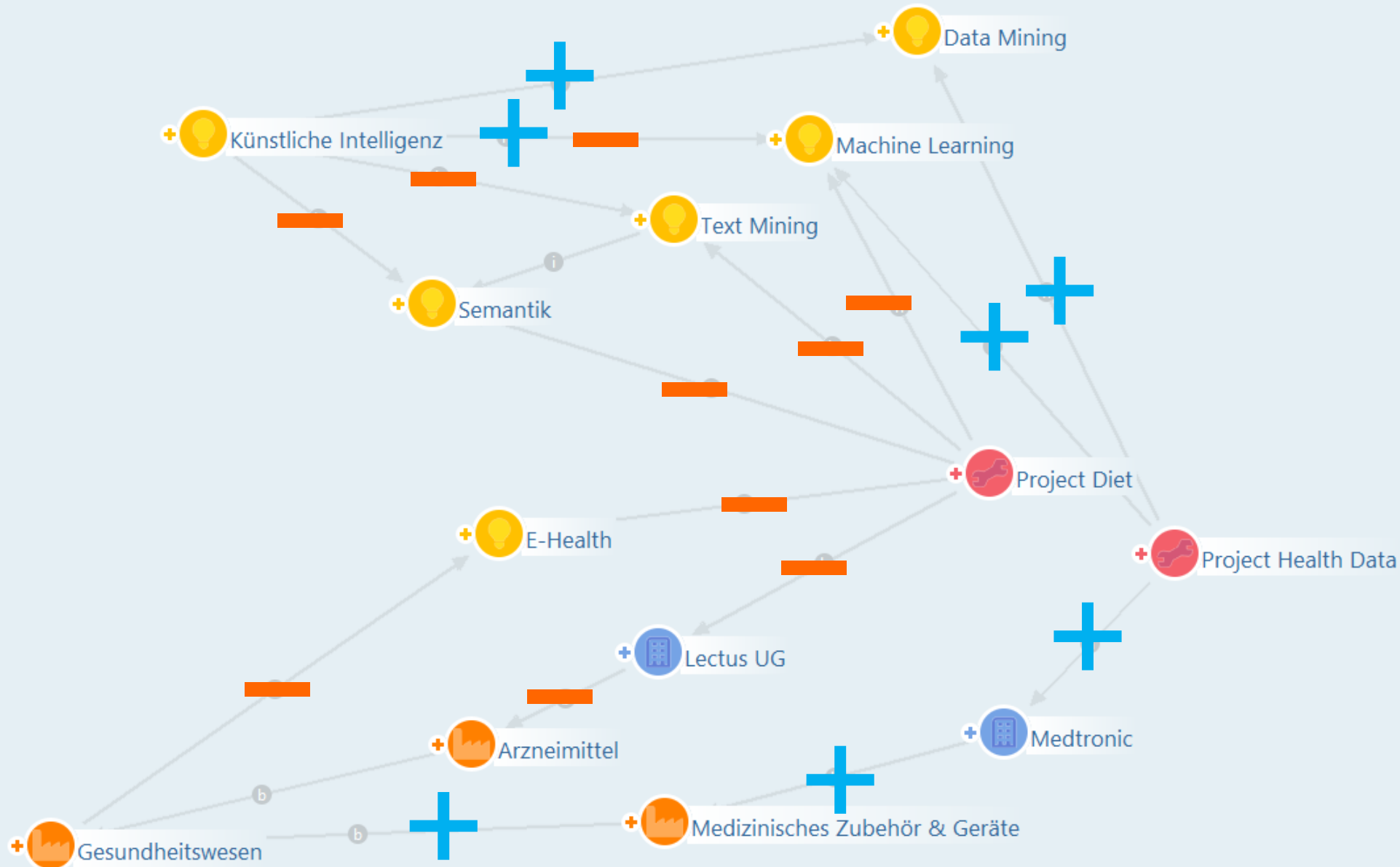




Learning from user interaction

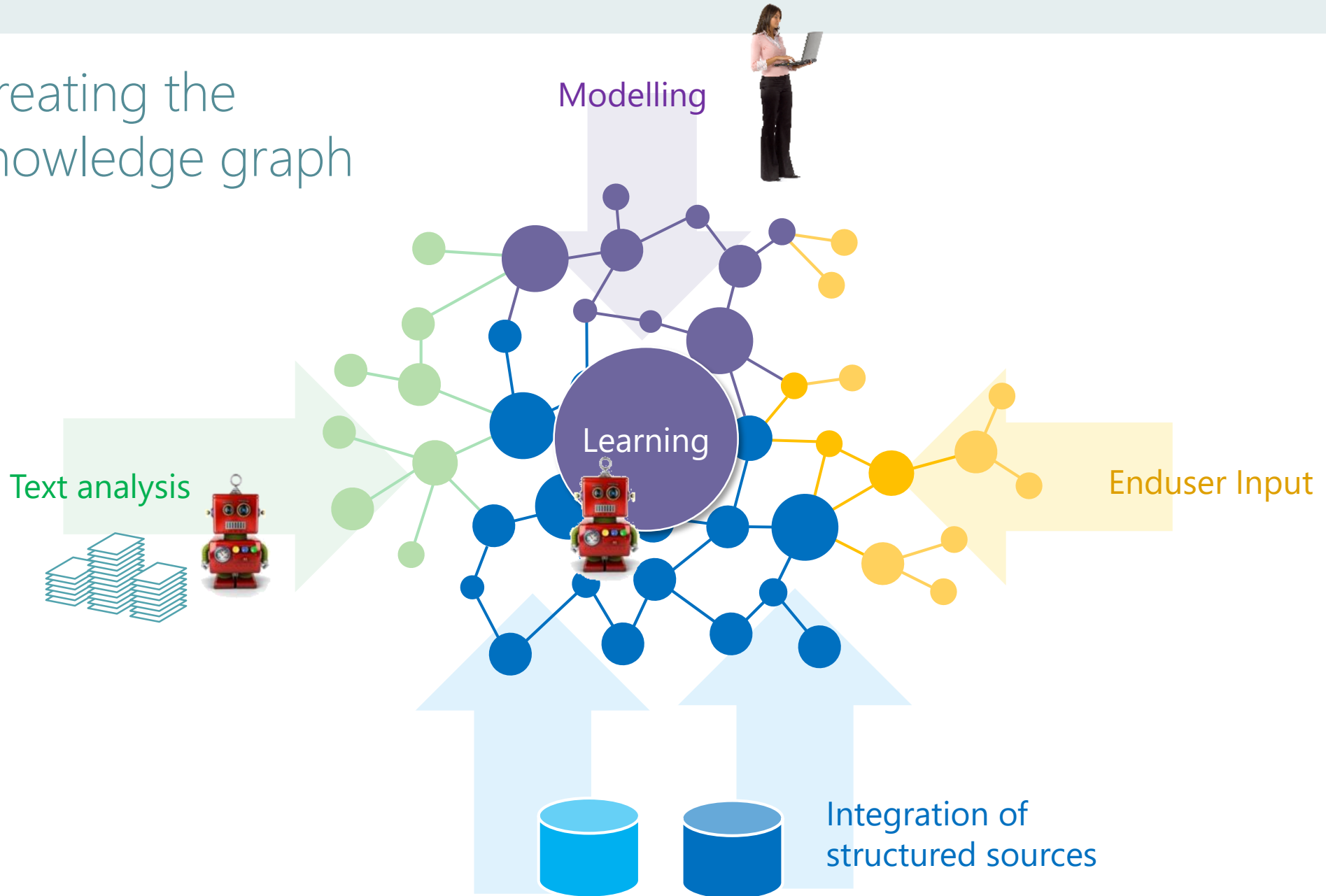






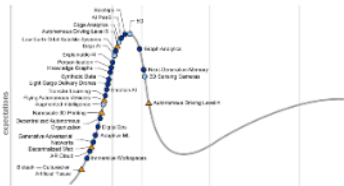


Creating the knowledge graph





Halftime



- Knowledge Graph: hype, hide complexity, embrace legacy information and automatic (ai) techniques
- Quickly show benefits, visualize and demo target and empower business experts
- „Show me a successful example (with the exact same use case, within my peer group)“
- **Knowledge Graph as a basis for operative Applications: “great power brings great responsibility”**



Suitable for users, web-based, configurable

- require no software deployment to use a knowledge graph
- user acceptance with established interaction patterns
- configurable for the modelled domain
- transactional reading and writing of data includes access rights and triggers

The screenshot shows the registration page for tilbago. The header includes the tilbago logo and a PostFinance logo. Below the logo, there is a navigation bar with the text 'Inkasso. einfach. online.' and 'Rechtliches Inkasso mit eSchKG'. The main content area contains a registration form with the following fields: 'Anrede:' (dropdown menu), 'Vorname:' (text input), 'Nachname:' (text input), and 'E-Mail:' (text input). There is also a 'Zum Login' button and a checkbox for 'AGB akzeptiert'.

The complete web-based offering of this FinTech company is based on the i-views Knowledge Graph. Next to core competencies (rules, implications, ...) the flexible configuration of web frontends and workflows is the key to making the tilbago services work and adaptable to changing requirements.



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The screenshot displays the 'tilbago' web interface, which is a debt recovery service. The header includes the 'tilbago' logo, the tagline 'Inkasso. einfach. online.', and the text 'Rechtliches Inkasso mit eSchKG'. A 'PostFinance' logo is also present. The main content area shows a multi-step process:

- Schritt 1 von 5: Schuldner anlegen/auswählen** (Create/Select Debtor)
- Schritt 2 von 5: Fall-/ Schuldnerdaten anlegen** (Create Case/Debtor Data)
- Schritt 3 von 5: Schuldneradresse anlegen** (Create Debtor Address)
- Schritt 4 von 5: Zuständiges Betreibungsamt** (Competent Debt Collection Office)
- Schritt 5 von 5: Forderung anlegen** (Create Claim)

The 'Schritt 5' form includes a warning message: 'Warnung! Es gibt fehlerhafte Einträge in den Werten.' (Warning! There are erroneous entries in the values.) and the following fields:

- Betrag (in CHF)***: 600
- Grund der Forderung***: unbezahlte Rechnung 08/15
- Datum Fälligkeit***: 01.10.2019

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Authorization, Auditing, Security

access rights on the graph

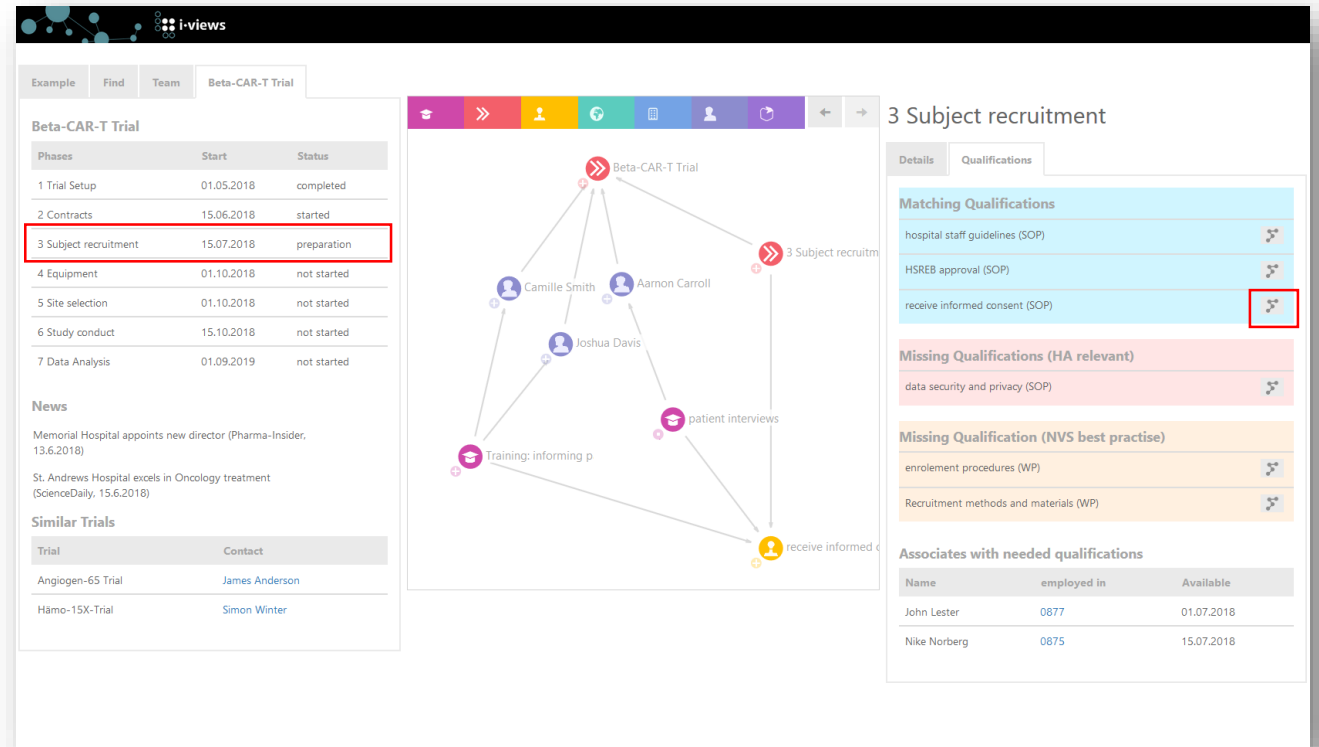
- on objects and properties/relations
- on meta-data
- via the graph itself

auditing

- audit log for all data accesses (CRUD)
- classical change-log

security

- access control
- integration into corporate authentication and authorization systems
- encryption of communication



The screenshot displays the i-views interface for a Beta-CAR-T Trial. On the left, a table lists trial phases with their start dates and statuses. The '3 Subject recruitment' phase is highlighted with a red box. The central graph shows relationships between trial phases and individuals like Camille Smith, Aamon Carroll, and Joshua Davis. On the right, a detailed view of the '3 Subject recruitment' phase shows a list of qualifications. The 'Matching Qualifications' section includes 'hospital staff guidelines (SOP)', 'HSREB approval (SOP)', and 'receive informed consent (SOP)'. The 'Missing Qualifications (HA relevant)' section includes 'data security and privacy (SOP)'. The 'Missing Qualification (NVS best practise)' section includes 'enrolment procedures (WP)' and 'Recruitment methods and materials (WP)'. The 'Associates with needed qualifications' table lists John Lester and Nike Norberg.

Phases	Start	Status
1 Trial Setup	01.05.2018	completed
2 Contracts	15.06.2018	started
3 Subject recruitment	15.07.2018	preparation
4 Equipment	01.10.2018	not started
5 Site selection	01.10.2018	not started
6 Study conduct	15.10.2018	not started
7 Data Analysis	01.09.2019	not started

Qualification	Match
hospital staff guidelines (SOP)	<input type="checkbox"/>
HSREB approval (SOP)	<input type="checkbox"/>
receive informed consent (SOP)	<input checked="" type="checkbox"/>

Qualification	Match
data security and privacy (SOP)	<input type="checkbox"/>

Qualification	Match
enrolment procedures (WP)	<input type="checkbox"/>
Recruitment methods and materials (WP)	<input type="checkbox"/>

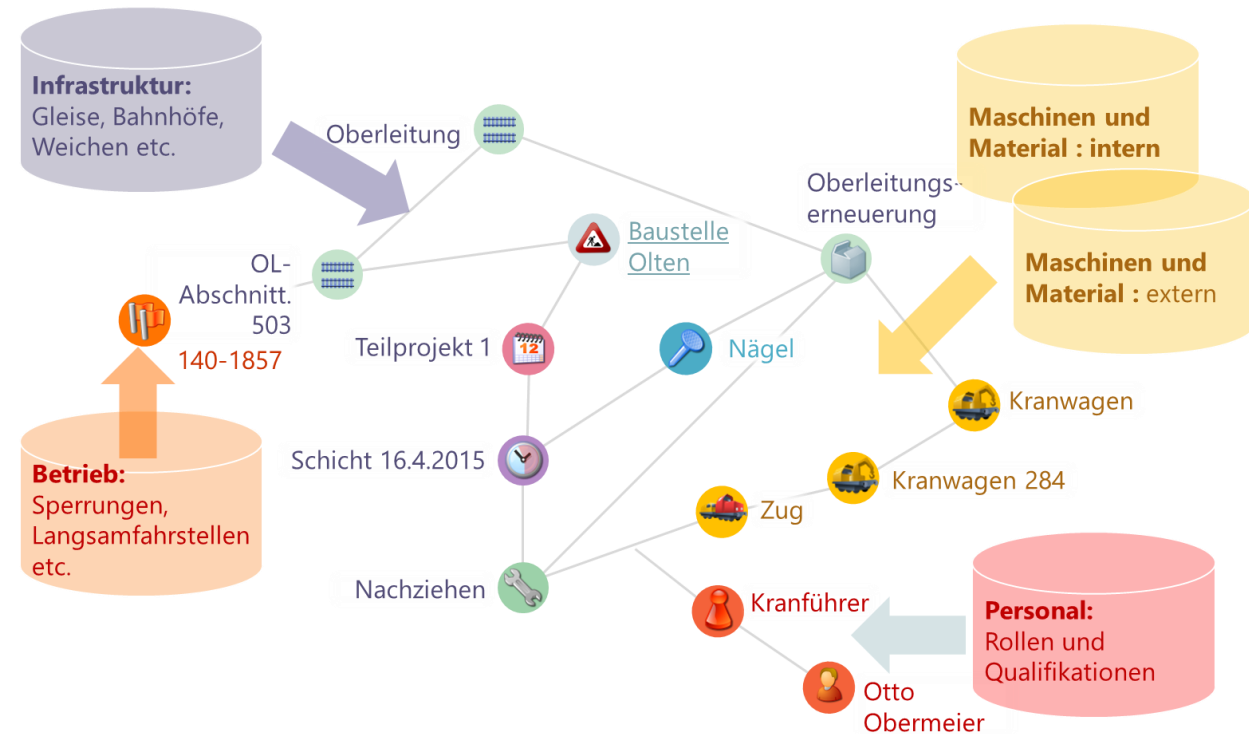
Name	employed in	Available
John Lester	0877	01.07.2018
Nike Norberg	0875	15.07.2018

Clinical studies: The knowledge graph offers help for study leads on regulation to "beachten", SoPs to follow and on necessary qualifications. Both the "Vorgaben" as the documentation / "Nachweis" are guarded by access rights: only study leads may change study data, only the legal department may change rules, each change has to be recorded etc.



Integrate into the existing landscape

- interfaces to industry-standard systems
 - table based data sources:
*SQL backends, flat-files, ODBC, ...
 - ActiveDirectory, LDAP, ...
 - ...
- adapt to different schemas in the existing IT systems
- only configuration, no interface code required
- two way synchronization (transactional read and write)
- automatable



Partial model of a rail construction site showing relevant infrastructure, resources like machines and material and persons with their roles, qualifications and authorizations.

All these are managed in detail in heterogeneous sources like several database types, flat files and message queues.

Most challenging was the mapping of different external models to the knowledge graph.

Be open for standards outside the semantic world

- JavaScript, REST, JSON, XML, ...
- requires less specialized knowledge/education
- frictionless integration into non-semantic environment
- support development partners

The screenshot displays the Siemens SIRIUS ACT product configuration web interface. The main content area shows a collection of electrical components, including push buttons and indicator lights, with a larger image of a specific component on the right. The interface includes a navigation menu on the left, a main product area with images of various components, and a right sidebar with additional information and links.

Drucktaster und Leuchtmelder SIRIUS ACT

Produktinformation | Konfiguratoren

Gehe zu

- Übersicht
- Nutzen
- Anwendungsbereich

Übersicht

Alle zu Drucktaster und Leuchtmelder SIRIUS ACT

- Vor dem Kauf & erste Info
- Online-Katalog und -Bestellsystem
- Technische Info
- Support
- Kontakt & Partner
- Service-Angebote

Witere Informationen

Homepage siehe <http://www.siemens.de/sirius-act>
 Konfigurator siehe <http://www.siemens.de/sirius-act/konfigurator>
 Umschlüsseltool siehe <http://www.siemens.com/sirius/conversion-tool>
 Handbuch siehe <https://support.industry.siemens.com/cs/ww/der/view/107542462>
 TIA-Portal siehe <http://www.siemens.de/TIA>

SIRIUS ACT – Befehlen und Melden

SIRIUS ACT ist ein modular aufgebautes System von Befehls- und Meldegeräten für Frontplattenbefestigung und rückseitig montierten elektrischen Modulen. Dank SIRIUS ACT mit PROFINET können Befehls- und Meldegeräte über PROFINET direkt mit der Steuerung und HMI-Geräten verbunden werden – auch mit Safety-Funktionen. Engineering und Inbetriebnahme werden durch das TIA Portal erleichtert.

Umfassendes Portfolio

- Kundenspezifische Varianten, z. B. Sonderschließungen, Beschriftungen, bestückte Gehäuse
- Kommunikationsfähig durch direkte Anbindung an AS-Interface, IO-Link oder PROFINET

Vielfältige Einsatzmöglichkeiten

- Nationale und internationale Approbationen
- Viele Branchenzulassungen
- Kurze Lieferzeiten durch weltweite Verfügbarkeit

Bestimmungen

- IEC/EN 60947-1
- IEC/EN 60947-5-1
- IEC/EN 60947-5-5 für NOT-HALT-Befehlsgeräte

Configuration of electrical switches to be included in a switchboard. The possible components for a selected actuator are modelled in a graph and include rules depending on co-selected components. The graph is queried via a REST API which was defined by the customer. This API is then used from a web-front-end developed by a different contractor.



Consider operations in general

schema transfer between environments

- supports standard development cycles (develop, test, integration, production)

live backup

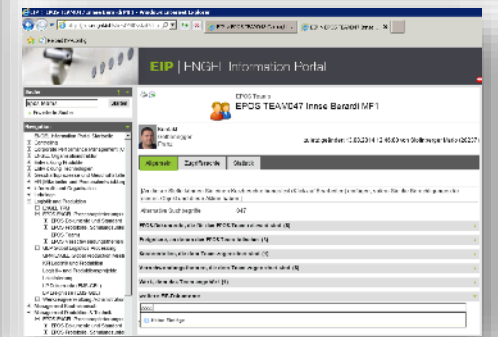
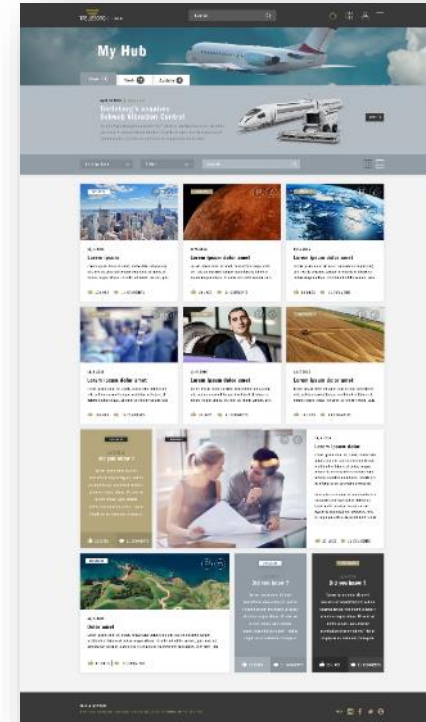
- stores transactional committed state
- no downtime

dynamic system schema and data

- on-the-fly changes (no materialization)
- flexibility

support both cloud and on-premise

- businesses have varying requirements





Summary and open questions

If we want to escape the sandbox, we have to face the challenges that come along:

- empower business users, be visible
- industry strength delivery and operations

Open questions:

- More concrete, specific experience in selling to decision makers and business units → see us in the exhibition area
- Modelling, Building rules and queries, Configuration of Frontends → see us in the exhibition area
- Connection to text analysis → see us in the exhibition area
- More technical detail → see us in the exhibition area

