FEATURE ARTICLE

Fenix: A Platform for Digital Partnering and Business Ecosystem Creation

Jarkko Hyysalo
University of Oulu

Markus Kelanti
University of Oulu

Tanja Sauvola
University of Oulu

Kari Liukkunen
University of Oulu

Jaakko Sauvola
University of Oulu

Contemporary world is a world of connections, co-dependencies and value networks. However, finding suitable partners and key competences require considerable effort. The proposed business ecosystem creation platform provides 24/7 “available everywhere” web service including digital infrastructure and tools for professional networking-agents, company representatives and researchers for up-to-date information retrieval and networking.

The future businesses are built based on value networks with a basis on a new business model(s), where partnering, specializing and joint solution deliveries are the key to sustainable success. Successful business operations on global markets often require companies to join forces, especially if they are small or narrowly specific – or both – to reach globally leading positions. Thus, concentrating on smart partnering is one key success factor. An elementary task is to facilitate the founding work for consortia work and to develop with the companies clear parameters of roles and responsibilities.

PARTNERING

Intraorganizational activities are no longer adequate for gaining competitive edge in global markets,[1] instead combining expertise and capabilities is suggested.[2] However, business ecosystem creation is challenging. It is difficult to build a team of organizations complementing each other’s expertise, which has strong export performance and deliverability capabilities, while being plausible actor in international markets. Projects and businesses are different and different technology-specific markets require different knowledge and different expertise. The problem is common: the needs and buyers and potential offers and partners don’t meet.

Effective networking with key experts is an absolute necessity in a rapidly changing, hyper-connected world – but we often have only limited time and resources for this elementary action.

Companies, research institutions and local public actors need agile digital services that provide real-time access to partners and assets information to ensure no business opportunity is missed. Thus, the question: *how to facilitate partnering in business ecosystem creation?*

To address these issues, we developed a tool that automatically matches the needs and expertise of organizations, and proposes partnerships. Fenix is a digital platform that creates a digital meeting place for buyers and sellers of high-technology assets – Business tinder for digitalization.

BUSINESS ECOSYSTEMS

Recently, there has been an increased interest in new service concepts, which take advantage of business ecosystems capabilities.[3] Ecosystems consists often from a wide variety of actors, in addition to partners and sub-contractors, they also include complementors, competitors, customers, collaborator companies, public bodies, incubators, investors and research organizations over several domains.[3–4] They have a common goal, a shared vision that helps organizations to position and align themselves in the value network.[5] Understanding the position enables adjusting the strategies for optimizing ones position.[6]

Benefits of ecosystems are, e.g., external R&D resources, which are available through R&D partnerships.[7] They enable organizations to respond quickly to changes and uncertainties without the need to build up internal R&D capacity, and they provide ability to quickly respond to promising new opportunities.[7] Ecosystems provide timely access to new scientific knowledge and technologies developed outside the organization's boundaries, which is crucial to competitive success in the high-tech industry.[7]

The combined capabilities are important. In value creation network an organization can focus on its core competences and utilize expertise from other areas through partners. Through relationships, organizations learn from its international partners' capabilities, needs, strategies, business conditions and market networks.[8] Also, due to joining networks, internationalization and expansion is typically nowadays experienced in leaps, instead of gradual growth.[9]

Challenges in business ecosystem creation

The current challenge in ecosystem creation is to recognize the suitable actors and domains to be contacted and involved in collaboration. Research should be involved in addition to business, and it may be beneficial to involve competitors as co-opetitors.[3, 11]

A common mistake in ecosystem creation is too rigid planning – the roles and responsibilities are set early without the natural evolution within the system. Business ecosystems are dynamic entities that should grow and evolve.[2] Thus, they must be kept up to date.[7]

There already are tools for analyzing the networks, like Agile Supply-Demand Networks and Design Structure Matrix, which are useful for designing the strategic networks and analyzing the dependencies.[11] There are also engagement platforms, customer touch points that enable actors to exchange resources and co-create value.[12] However, these tools and platforms focus on fostering and facilitating already existing networks and managing co-creation processes. They don't explicitly address the creation of new partnerships and networks. Also empirical evaluations on them are scarce.[12]

Therefore, we present our experiences to add in the knowledge base, and complement the relationship management point of view with matchmaking and setting up a business ecosystem view, and thus offer new insights to both researchers and practitioners.

FENIX PLATFORM

Fenix has been developed to find and connect partners. It is a real-time business case management tool for finding the right partners and creating compelling offerings. Fenix proposes a new way of collaborating and establishing new business opportunities.

The Fenix front-end is developed with Angular 2 to be a browser-based application supporting different devices, see Figure 1. The main Fenix application connects with back-end services using REST calls and exchange message content with JSON objects.

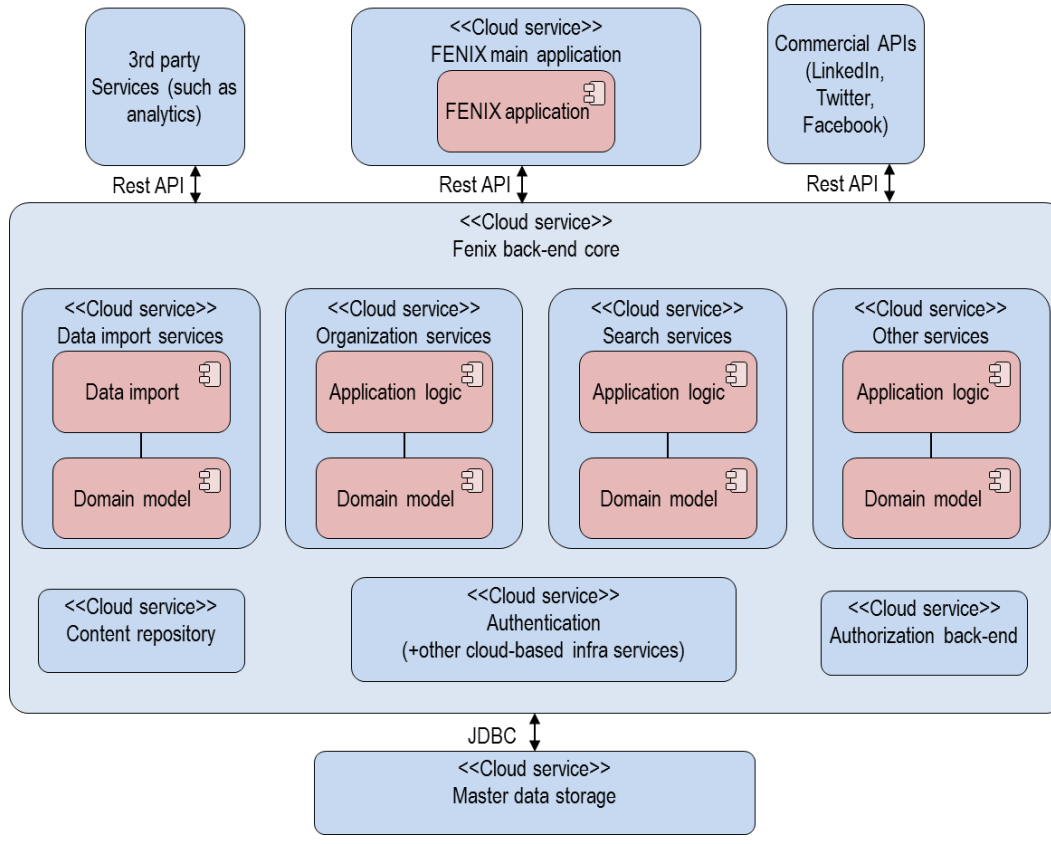

Figure 1. Fenix architecture and example service decomposition. Diagram contains examples of services in order to clarify the intended service decomposition.

The system offers services based on a modular architecture. Main application is orchestrating user-experienced functionality by calling independent services as needed. Service components are independently deployable services that have no tight dependencies with other parts of the solution. These services can be added to the environment on the go. This model allows the addition of new functionality in a flexible manner with minimal disturbance to existing application.

Common data storage (master data storage) stores data for all services. Independent services have their own data model, so that they access only the needed data. Data storage can also be internal part of service components. In that case, it is required to provide common view to master data. Master data storage is secured by encryption. In case content (additional material such as textual documents, videos and voice recordings) must be added to Fenix data objects, there is a content repository to hold it.

Cloud services are utilized for runtime application service platforms, authentication/authorization, searching, load balancing, monitoring and data enhancement and handling of Fenix system. A cloud provider administration console is used to manage cloud-based environment.

The Fenix platform supports separate security levels allowing access to specific data and functionality based on user role or account. A back-end database supports authorization requests and is used to store authorization details.

Data migration functionality is available to migrate data from external parties to Fenix master data database. Finally, commercial APIs (e.g. LinkedIn, Twitter, and Facebook) may be utilized, e.g., to import/export data.

The main Fenix user interface is a browser application. Fenix Service users' UI flow is designed to be cohesive and coherent, regardless of the user profiles, privileges or which device is used. Therefore, the content displayed and the actions allowed depend on the type of Fenix user and the privileges associated to that Fenix user.

The main matchmaking component – Tags

Assessment of the organizational fit is a fundamental determinant while determining the resource complementarity and its potential value. A way to determine the fit and making the needs and offerings meet is a systematic process to identify the four sources of value 1) resource complementarity, 2) resource nature, 3) resource directionality and use, and 4) linked interests[13].

In Fenix, values are identified with tags. Tags are specific and address competences, technologies, recourses etc. Organizations, contacts and cases have tags attached to them. Tags are the main matchmaking component, which are used in searching and matching companies by shared interests, see Figure 2.

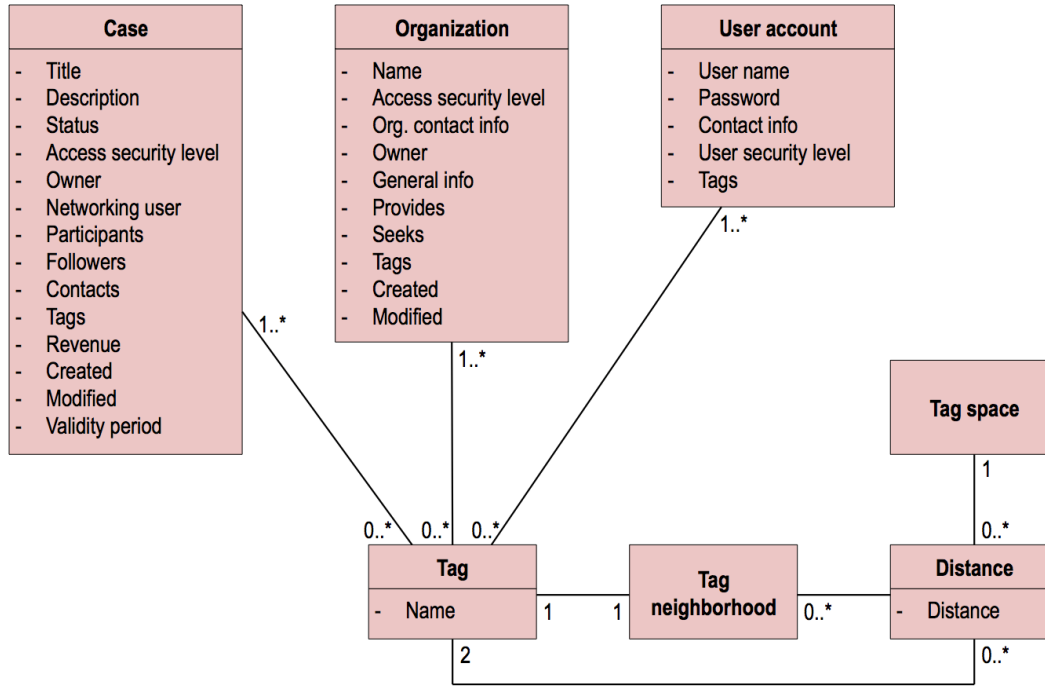

Figure 2. Logical information model for tags.

Tags are used for describing, clustering and searching users, organisations and cases. The system comes pre-installed with a wide selection of tags, relating to lines of business (games, telecom, consulting, analytics, etc.) or types of offerings (products, services, investing, etc.), etc. The user can also suggest new ones or request the removal of obsolete ones.

Tag neighborhood contains the tags "close" to a given tag, up to an arbitrary distance. The "closeness" is defined by a distance measure between tags. Fenix can find tags often appearing together with a given tag or set of tags, along with a distance measure between the given tag and the found ones.

Distance is a measure that describes the "closeness" between two tags. Tag distance/matching is a quantitative measure (e.g., tag X appears in association with tag Y 50% of the time). It is a continuously evolving measure.

Tag space contains all the tags and their distances from each other.

SAMPLE IMPLEMENTATION

To evaluate the feasibility of Fenix platform, we developed a proof-of-concept implementation addressing the problem: Information about companies, research institutes and business opportunities and competences is dispersed into various databases and services.

There was a need to aggregate this information under one digital service point. To address this issue and validate the Fenix platform in a real life environment we implemented a service for the Hilla program (www.hilla.center/) and other ongoing ventures for enhancing Finnish industry revenue growth. Fenix implementation involved several organizations operating on various domains, like applications and services, devices and R&D solutions, testing and certification, manufacturing, and research. Our implementation allowed cross-database searches and tools for joint company data search and new business case creation tools via managing business case-related data on real-time.

Smart partnering with Fenix

In the Fenix system (see Figure 3), company A representative described the business idea shortly by creating a new case. The company A representative continued then searching other companies with different keywords. While he was doing that, the Fenix system alerted him as a company B representative noticed his advertisement. The company B representative showed interest to the business idea by clicking the "Join to case" button in the Fenix system. Then company B representative called company A representative and they discussed the business idea.

Both representatives agreed to hold a meeting. As the company A representative was creating a Doodle poll to decide the meeting time, he got another alert from the Fenix system from Company C. Then he received an email where the company C representative asked that whether a meeting could be arranged to discuss the idea. Company representative A hid the advertisement in the Fenix system and entered email conversation with company representatives B and C and they agreed to meet together based on the Doodle results.

After the meeting, the company representatives agreed to create a new case for the Fenix system in order to seek further experience and assistance to create the product they envisioned during the meeting.

Figure 3. Fenix implementation and UI. (a) Organizations fill in their data on Fenix system and select suitable tags to present their organizations interests and expertise. Similarly, cases are initiated based on the description and tags. (b) Fenix system compares the tags and creates a list of potential partners if the distance between the tags is below a certain threshold. (c) A list of potential partners is then presented to users with a possibility to send an invitation.

Utilization of analytics in the Fenix engine allows examination of the users' behavior in tag creation and use. This enables important features such as matchmaking for the business cases and identification of suitable partners. For trend analysis and predication, requested by public bodies

and government, analytics serve another role. The behavior of tags can be used to determine changes in business environment and technology and communicate that between Fenix users. This information is supplied to participating public bodies to aid their decision-making.

The principle is that the user is allowed to create any tag with any name and assign them to their own profile, company profile and any case the user creates or participates. The community and ecosystem is relied upon to create rules how tags work and what tags are accepted and promoted. Fenix facilitates this by allowing the creation and use but utilizes weights and logarithmic/linear scaling in the Fenix engine to determine what tags are more important than others. Tags are in certain order in every profile; the logarithmic/linear scaling automatically assigns weights to the tags, giving them order of importance. Therefore, as the system allows infinite generation of tags, the scaling and weighting forces users to decide the order of importance.

The order of importance and number of matching tags are used to determine what potential partners are being shown first for a business case or search results. As the users perceive and analyze the tags, they will adapt, mimic or differentiate their own tags to place themselves in the right groups and differentiate themselves to show their own potential. This allows the tag database to fluctuate and weight itself constantly based on the ecosystems behavior.

Benefits of Fenix platform

To address the challenges of partnering in business ecosystem creation the Fenix platform was created. Based on trial use Fenix users commented that tags were very useful, and they were utilized to find and profile useful data. Users found the system useful for setting up new connections and new projects, even with limited amount of users. Especially facilitating the cross-domain connections and setting up partnerships outside their own networks was benefitting the users. For example, an organization working on a water domain commented that they aren't well connected with information and communications technology (ICT) networks, but through Fenix they could easily build a project with ICT organizations. Furthermore, the amount of different actors nowadays is huge and no one knows all of them, but with Fenix organizations can easily find the right actors, contact them and share material.

As the examples above show, Fenix enables a quick contact place for organizations and facilitates business ecosystem creation. Fenix allows the rapid retrieval of company and research institute contact information and key competencies. In addition, it retrieves information about public and private sector financing stakeholders and instruments. Fenix also provides a digital infrastructure and a repository for managing business cases associated with partnership networks. Finally, it records ongoing active business cases and unexploited opportunities that could be activated whenever suitable partners are identified.

Fenix added value includes: 1) Search and aggregation of dispersed public and private data-repositories (i.e. mimic Trivago.com and Momondo.com service logic), 2) Real-time business case management tools and infrastructure for business and research oriented match-making (i.e. mimic Tinder.com).

The proper fit of organizations in the business ecosystem improves the potential for value co-creation. With Fenix platform organizations could improve their capabilities and facilitate and expedite the creation of partnerships, enable data transfer between actors, and promote new business models, with the goal of creating novel services and applications that enhance network building and business case management.

CONCLUSION

Fenix is a modern software-as-a-service platform designed for enhancing SME's revenue growth via digital partnering and ecosystem creation strategies. The Fenix platform provides 24/7 "available everywhere" web service including digital infrastructure and tools for professional networking-agents, company representatives and researchers for up-to-date information retrieval and networking under one contact-point. The Fenix platform engine leverage modern web technology for search and data aggregation, e.g., leveraging public and private APIs and social media

repositories for gathering data on companies, research institutes and financiers. Fenix user services provide intuitive and easy to use interface for managing business cases, partner networks and ecosystems via web browser, Android and iOS tablets, and smartphone applications.

Fenix will offer efficient cloud-based services to make up-to-date lead/business/partnering case data accessible anywhere, utilize valuable data in different public private partnerships, foreign direct investments and business partnering contexts, and accelerate and control the deal making with information-in-hand when it is needed.

A future challenge is growing a viable user population to make Fenix a truly useful tool outside of the academic space. Future work includes also more thorough studies on human aspects like trust and culture. Finally, the utilization of artificial intelligence and machine learning in Fenix is still in the early stages of development and need further development.

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ABOUT THE AUTHORS

Jarkko Hyysalo is a postdoctoral researcher in the Faculty of Information Technology and Electrical Engineering at the University of Oulu. His research interests include software architectures and processes, IoT, and collaborative work. Hyysalo received a PhD in infor-

mation processing science from the University of Oulu. Contact him at jarkko.hyysalo@oulu.fi.

Markus Kelanti is a postdoctoral researcher in the Faculty of Information Technology and Electrical Engineering at the University of Oulu. His research interests include analytics, system architectures, and software intensive systems and service development. Kelanti received a PhD in information processing science from the University of Oulu. Contact him at markus.kelanti@oulu.fi.

Tanja Sauvola is a doctoral student in the Faculty of Information Technology and Electrical Engineering at the University of Oulu. Her research interests include agile and lean development, UX design, and continuous experimentation. Contact her at tanja.sauvola@oulu.fi.

Kari Liukkunen is a program manager at the University of Oulu and director of Finland's High-Tech ICT Leverage from Long-Term Assetization (HILLA) Program. His research interests include wireless ICT, digital services and health ecosystems. Liukkunen received a PhD in information processing science from the University of Oulu. Contact him at kari.liukkunen@oulu.fi.

Jaakko Sauvola is a professor of data-intensive systems and advanced software at the University of Oulu and leader of Finland's High-Tech ICT Leverage from Long-Term Assetization (HILLA) Program. His research interests include mobility, system architectures, and data-intensive services and analytics. Sauvola received a PhD in technology from the University of Oulu. Contact him at jaakko.sauvola@oulu.fi.