

Innovation ***Startup Strategies***

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Inria

LEAN  CALE

Outline

- Technological innovation
- Startup stories
- Innovation at LeanXcale
- Hints to promote innovation

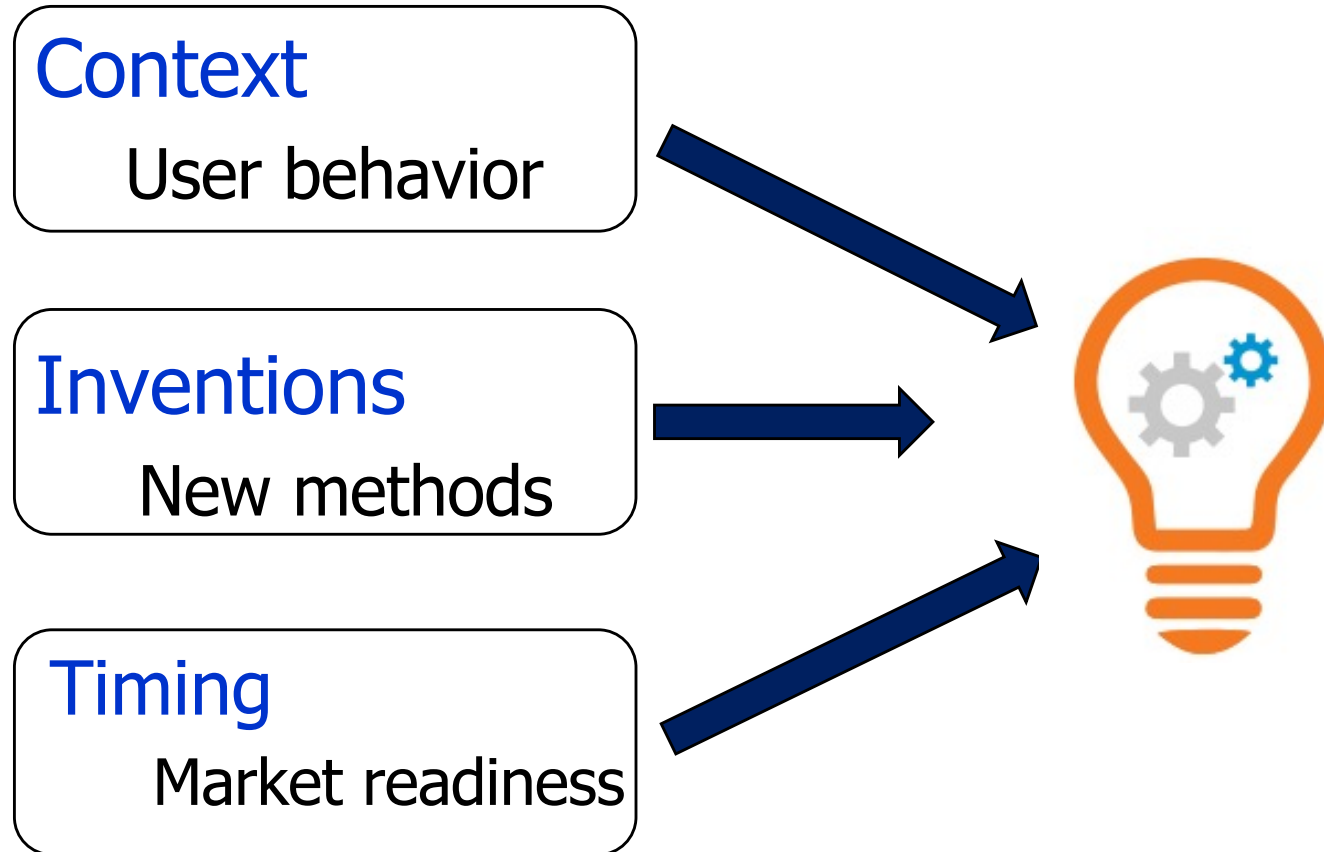
Technological Innovation



Technological Innovation

- Definition: innovation driven by technology
 - Note that innovation (in general) can also be driven by new business models, e.g. two-sided networks (Uber, Airbnb, LeBoncoin, Doctolib, ...)
- Strategies to promote innovation
 - Within an organization, one can have a formal process, driven by *managers* who follow the (known) company strategy
 - Within a startup, it is hard to formalize (and manage) as the context may be unknown or quickly changing, hence the need for *leaders*

Technological Innovation Process



Invention versus Innovation

- An invention is a new “thing” (method, process, machine), e.g. writing, printing, smartphone
 - Can combine several inventions, e.g. the smartphone is a computer, a mobile phone, an appdev, etc.
- An innovation is an invention that causes change in user behavior or business
 - Innovation is hard: only a few inventions lead to real innovation
 - Innovation can be genius, e.g. Web, or accidental, e.g. pacemaker
 - Innovation can take time, e.g. the “airplane” was invented by Leonardo da Vinci in the 16th century

Patents

- Documenting, protecting, and leveraging inventions is critical for innovation
- Patents are evidence of inventions with
 - Legal protection of intellectual property
 - Documentation of the invention, so that others can improve on
- Some (heavily cited) patents yield innovations while many do not
 - Martin Campbell-Kelly & Patrick Valduriez: A Technical Critique of Fifty Software Patents, *Marquette Intellectual Property Law Rev.* 249, 2005

The Nose Pick Patent



US00D430934S

United States Patent [19]

Willard

[11] **Patent Number: Des. 430,934**

[45] **Date of Patent: ** Sep. 12, 2000**

[54] **NOSE PICK**

[76] **Inventor: Charles E. Willard**, 453 W. Mechanic St., Shelbyville, Ind. 46176

[**] **Term: 14 Years**

[21] **Appl. No.: 29/097,842**

[22] **Filed: Dec. 15, 1998**

[51] **LOC (7) Cl. 24-02**

[52] **U.S. Cl. D24/147; D11/157; D11/160; D24/133**

[58] **Field of Search** D24/133, 146, D24/147, 155; 606/162, 161; D11/157, 160; D21/811, 812; D1/109; D32/40, 43, 46

[56] **References Cited**

U.S. PATENT DOCUMENTS

D. 260,866 9/1981 Richards D11/160
D. 353,239 12/1994 Briscoe D32/43

D. 360,720 7/1995 Drevo et al. D32/4
D. 400,326 10/1998 Fisher D32/4
5,895,408 4/1999 Pagan 606/16

Primary Examiner—Ian Simmons

Attorney, Agent, or Firm—Woodard, Emhardt, Naughtor Moriarty & McNett

[57] **CLAIM**

The ornamental design for a nose pick, as shown and described.

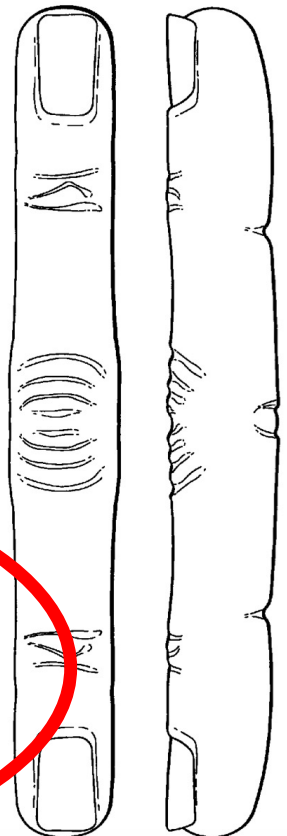
DESCRIPTION

FIG. 1 is a plan view of a nose pick, showing my new design;

FIG. 2 is a side view thereof with the opposite side view being a mirror image thereof.

FIG. 3 is a bottom view thereof; and,

FIG. 4 is an end view with the opposite end view being a mirror image thereof.



1 Claim, 1 Drawing Sheet

The Magnetic-core Memory Patent

- U.S. Patent 2,736,880: Multicoordinate digital information storage device (coincident-core memory)
 - Jay Forrester (MIT): filed May 1951, issued Feb. 1956
 - 10 pages, highly technical
- Context: Whirlwind computer project at MIT in 1950
 - Required a fast memory for real-time aircraft tracking
 - MIT computer scientist Jay Forrester invents the coincident-core memory that enables the 3D storage of information
- Impact
 - 9 other patents from other inventors
 - Used by all mainframe computers from 1955 to 1975
 - Big \$ patent royalties for MIT

Some Startup Stories

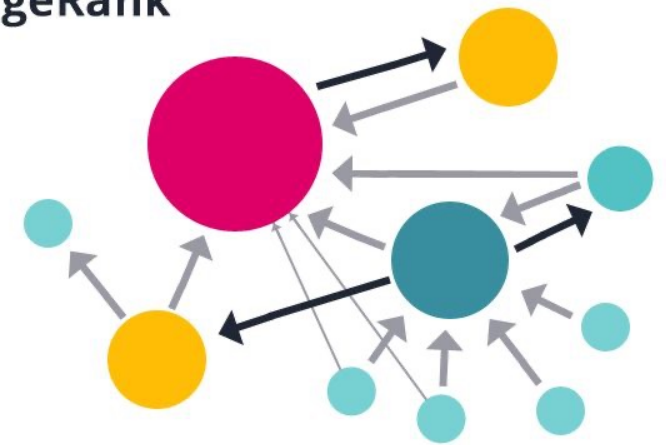


ORACLE® once a startup

- Context: the beginning of relational DBMSs
 - Seminal article: A Relational Model of Data for Large Shared Data Banks, by Edgar F. Codd, CACM, 1970
 - Ingres project at UC Berkeley (1975-1980)
 - System R project at IBM Research (1975-1980)
 - Invention of the SQL language
- Innovations in Oracle 2.0 (1980)
 - Implementation of the SQL language
 - With known techniques (published in research papers) from System R and Ingres
 - Accidental incompatibility with IBM System R
 - Thanks to IBM that kept its error codes secret
 - Support of UNIX and other OSs

Google the beginning

PageRank



- Context: Digital Library project at Stanford U.
- Invention in 1996 of the PageRank algorithm by Page & Brin (then PhD students)
 - U.S. Patent 6,285,999: Method for Node Ranking in a Linked Database, Lawrence Page (Stanford U.), September 4, 2001
- Basis for Google's search engine in 1998
 - Straightforward implementation on a cluster of commodity servers

Bitcoin & Blockchain



- **Invention**

- White paper: Bitcoin: A Peer-to-Peer Electronic Cash System, Satoshi Nakamoto (pseudo), Oct. 31, 2008 (Halloween)
- Cryptocurrency and payment system, with blockchain as the infrastructure

- **Innovation**

- Combines well-known techniques (P2P, data replication, consensus protocols and cryptography), yet in a clever way
- The first solution to the double-spending problem of previous cryptocurrencies

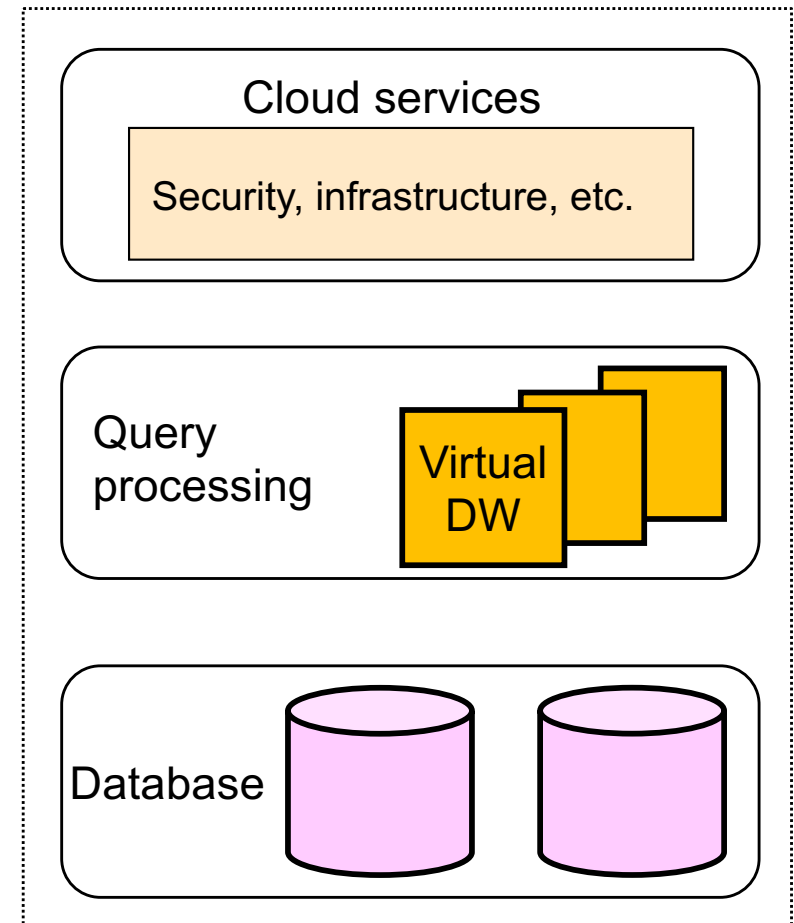
kelkoo Internet price comparator

- Context: Dyade, a joint venture between Bull and Inria (1996-2001)
- Inventions
 - Distributed Information Search COmponent (DISCO)
 - A. Tomasic, L. Raschid, P. Valduriez. Scaling Access to Heterogeneous Data Sources with DISCO. IEEE TKDE, 1998
 - Wrapper development toolkit
 - Combines state-of-the-art software engineering techniques
- Innovation
 - Fast access to Internet data sources with DISCO
 - Automated data source connection with wrapper development toolkit



- Largest IPO at Nasdaq ever (09/2020)
- Cloud support
 - AWS, Azure, Google Cloud
- Innovation
 - Independent levels
 1. Cloud services
 2. SQL query processing on virtual DWs
 3. Database
 - Separate provisioning and invoicing

Cloud data warehouse



A screenshot of the LeanXcale website's hero section. The background is a dark blue gradient with faint, light blue line art of gears and mechanical parts. At the top left is the LeanXcale logo. A horizontal navigation bar at the top right contains links: LEANXCALE, PRODUCT, PRICING, USE CASES, RESOURCES, BLOG, COMPANY, LOGIN, and a white-outlined button labeled FREE TRIAL. In the center, the text "THE DATABASE FOR FAST-GROWING COMPANIES" is displayed in large, bold, white capital letters. Below this, a smaller line of text reads "LeanXcale is a scalable SQL database with fast NoSQL data ingestion and GIS capabilities". At the bottom, there are two white-outlined buttons: "TRY IT!" and "FREE FOR STARTUPS".

LEANXCALE

LEANXCALE PRODUCT PRICING USE CASES RESOURCES BLOG COMPANY LOGIN

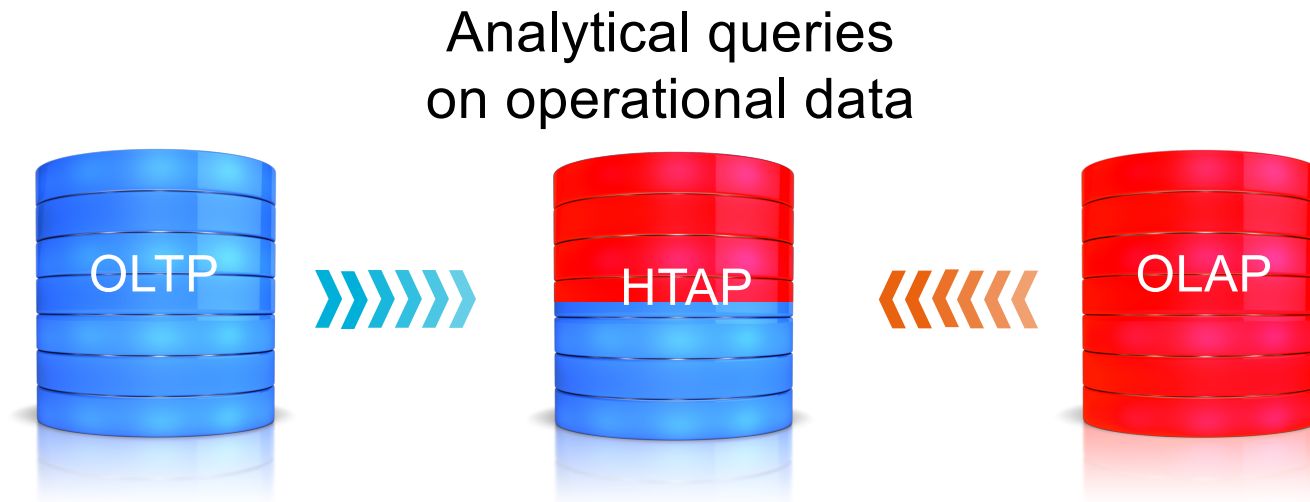
FREE TRIAL

THE DATABASE FOR FAST-GROWING COMPANIES

LeanXcale is a scalable SQL database with fast NoSQL data ingestion and GIS capabilities

TRY IT! FREE FOR STARTUPS

HTAP: blending OLTP & OLAP



- Advantages of Hybrid Transactional Analytical Processing*
 - Cutting cost of business analytics by up to 75%
 - Simpler architecture: no more ETLs/ELTs
 - Real-time analytical queries on current data

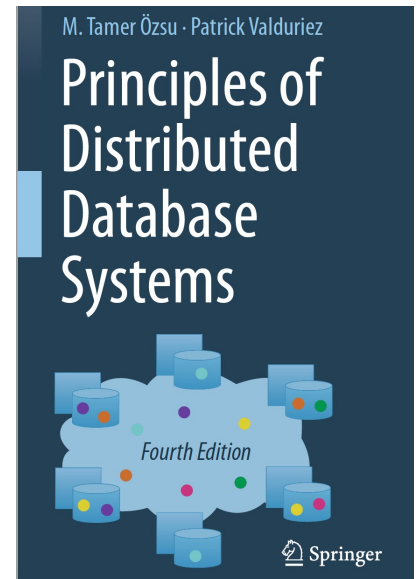
*Gartner, 2015

The Company

- Created in Madrid in 2015
- CEO and founder: Professor Ricardo Jimenez-Peris
 - Expert in distributed data management, with +100 research publications and +10 patents
- Business advisor: Glenn Osaka
 - Former President of Reactivity (acquired by Cisco), former VP at HP, Cisco & Juniper Networks, advisor for Paypal
- Scientific advisor: Patrick Valduriez
 - Expert in distributed data management, co-author of the standard textbook
- Strong team of engineers
 - MS and PhD degrees

More than 10 Innovations!

LEAN  CALE



Ultra-Scalable OLTP

SQL Fully ACID DB

Polyglot

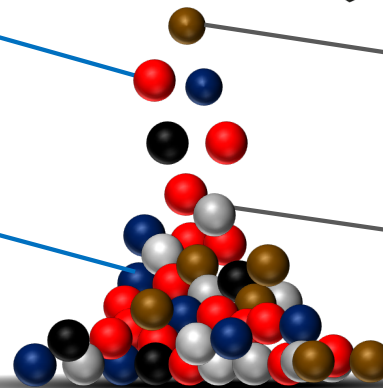
Queries across SQL, HBase, Neo4J,
MongoDB, & Hadoop data lakes
Integration with Data Streaming

**OLAP over
Operational Data**

Real-Time Big Data

Elastic & Ultra-Efficient

Non-disruptive data migration,
continuous load balancing and



Ultra Scalable Transaction Processing*

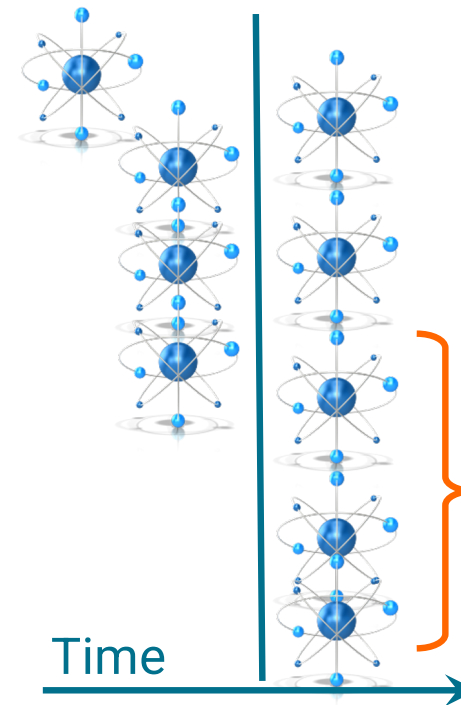
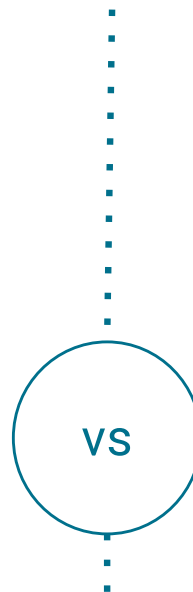
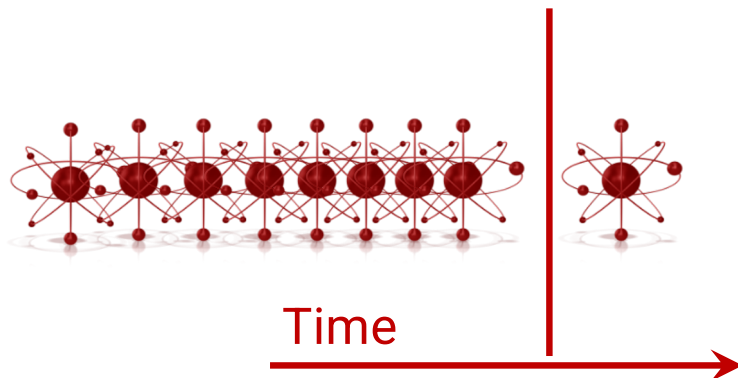
Traditional approach



LEAN SCALE



Single-node bottleneck



Processes & commits transactions in parallel

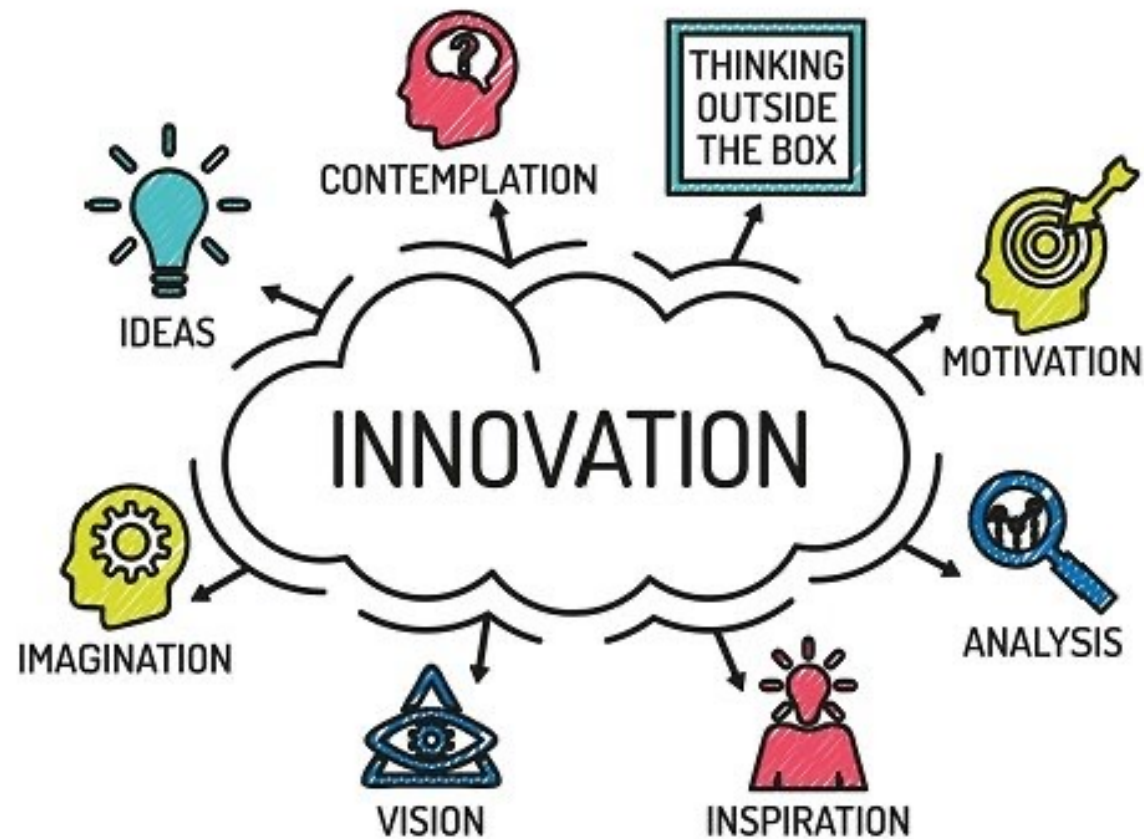
Provides a consistent view

* R. Jimenez-Peris, M. Patiño-Martinez. System and method for highly scalable decentralized and low contention transactional processing. Priority date: 11th Nov. 2011. European Patent #EP2780832, US Patent #US9,760,597.

LeanXcale Innovation Strategy

- Capitalize on leaders' knowledge and experience to understand the huge state-of-the-art
 - Encourage employees' education and training
- Stay in touch with the research ecosystem to promote and confront ideas
 - Talks in top conferences (BigData, SIGMOD, ...), top universities (UC Berkeley, U. Waterloo, ...) and high-tech companies (Facebook, Tweeter, ...)
- Encourage "cerebration" (group thinking and collaboration)
 - To promote innovation beyond invention
- Select ideas based on customers' feedback and cost-benefit analysis
 - Priority to product features that have more business potential with least effort
 - 2 or 3 patents a year

Promoting Innovation



Some Hints

- Attract (or work with) creative people
 - Universities, research labs, startups
- Promote celebration by creating a general sense of permissiveness
 - Avoid simplified PKIs and easy metrics
- Encourage creative employees to share their ideas, even preliminary
 - Avoid self-censorship
- Leverage leaders' years of experience and knowledge
 - Educate employees and help push ideas
- Work with key customers to select ideas
 - Turn them into innovations