



La transformation numérique en santé, Quelles innovations?

IBM ISC- 14-15 janvier 2016

Préparé pour les professeurs
d'Eco-Gestion



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100 ans d'innovations

RISC Architecture
1980



Silicon Germanium Chips
1994



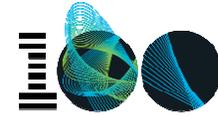
Deep Blue
1997



Racetrack Memory
The Future of Data Storage
2004



Breaking the Petaflop Barrier
2008



The Invention of Stream Computing
2009

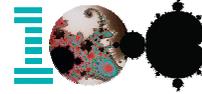


A Computer Called Watson
2011 : the first computer to compete and win against humans on television's quiz show, *Jeopardy!*.



Scanning Tunneling Microscope
1986 : Nobel Prize in Physics

Cryptography for a Connected World
1977



Fractal Geometry
1967



The Floppy Disk
1967



DRAM
Dynamic random access memory
1965



Pioneering Speech Recognition
1962



The PC
1981



The Apollo Missions
1969



Magnetic Stripe Technology
1969



UPC
The Universal Product Code (UPC) barcode
1973



The Invention of the Rewritable Magneto-Optical Disk
1970



The IBM Punched Card
1928



Pioneering Machine-Aided Translation
1931

The Selectric Typewriter
1961



IBM 1401 The Mainframe
1959



Relational Database
1970



International Business Machine
1920

The Automation of Personal Banking
1934



FORTRAN
FORmula TRANslating System
1957



The Punched Card Tabulator
1911

Automated Test Scoring
1937



RAMAC
Random Access Method of Accounting and Control
1956



Magnetic Tape Storage
1952



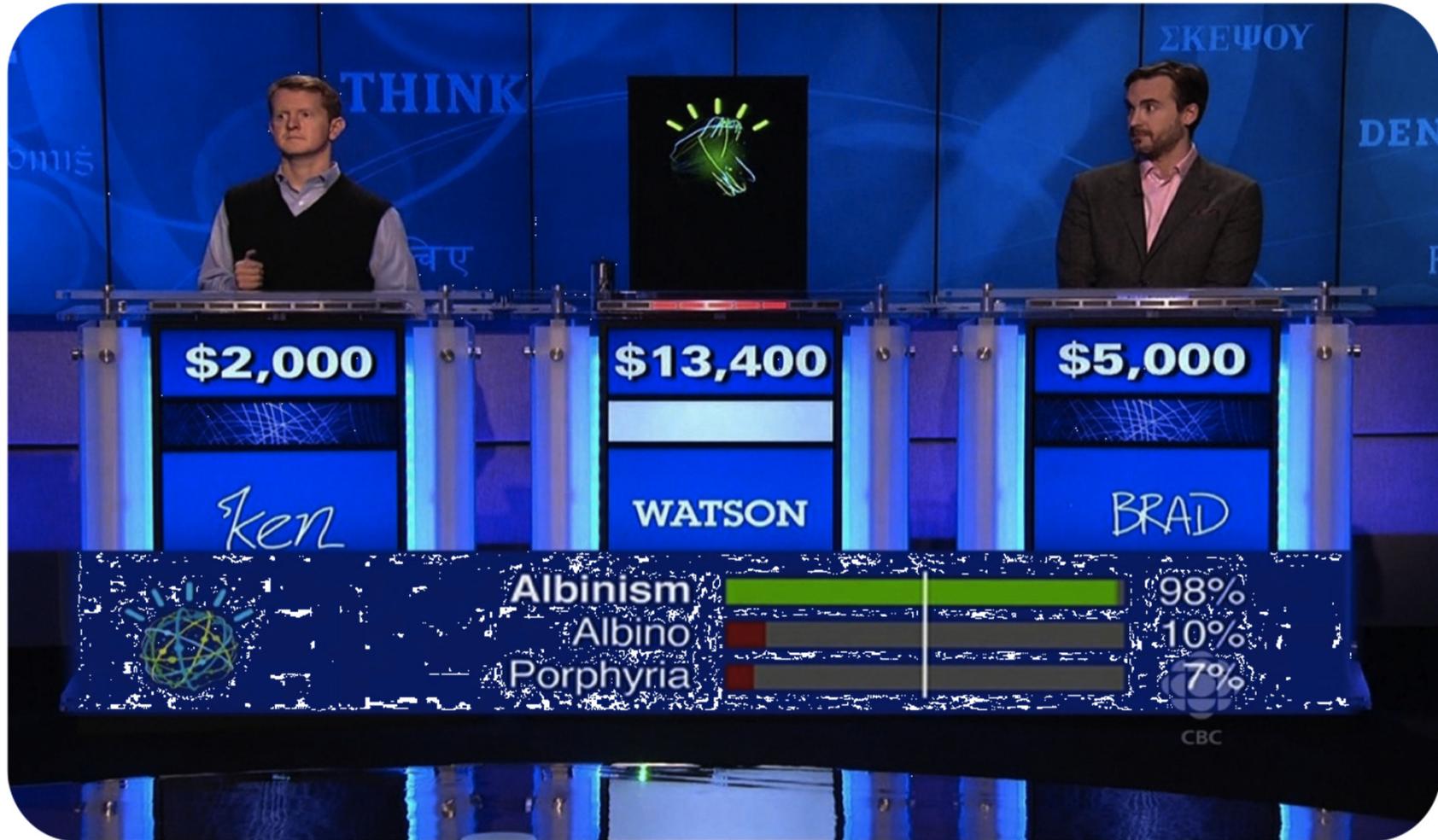
Radiotype Wireless Data Transmission
1935

IBM Is Founded
1911 : Computer-Tabulating-Recording Company

1997, Deep Blue gagne aux echecs



Février 2011, IBM Watson gagne "Jeopardy!"

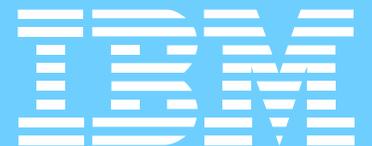


The Cognitive Era.

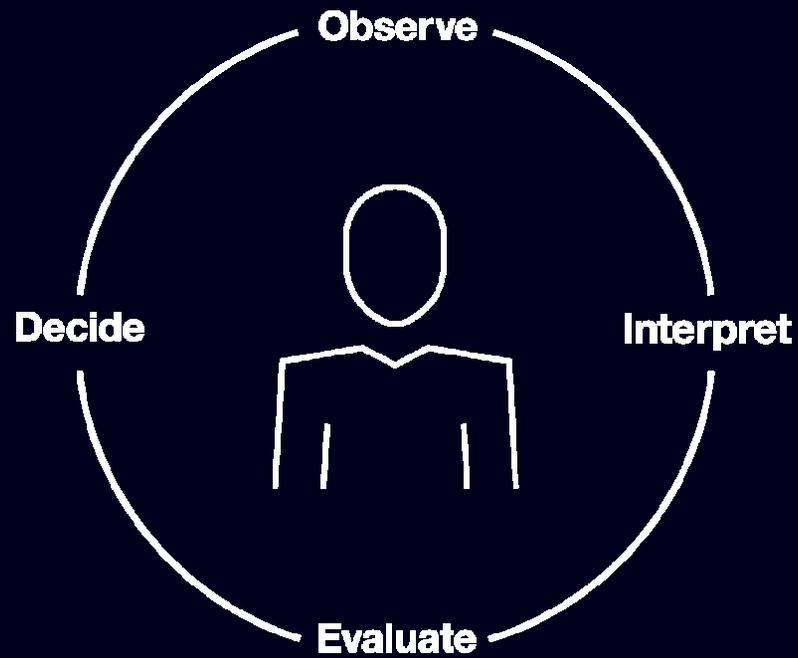


**Ginni Rometty: Forget digital,
cognitive business is the
future**

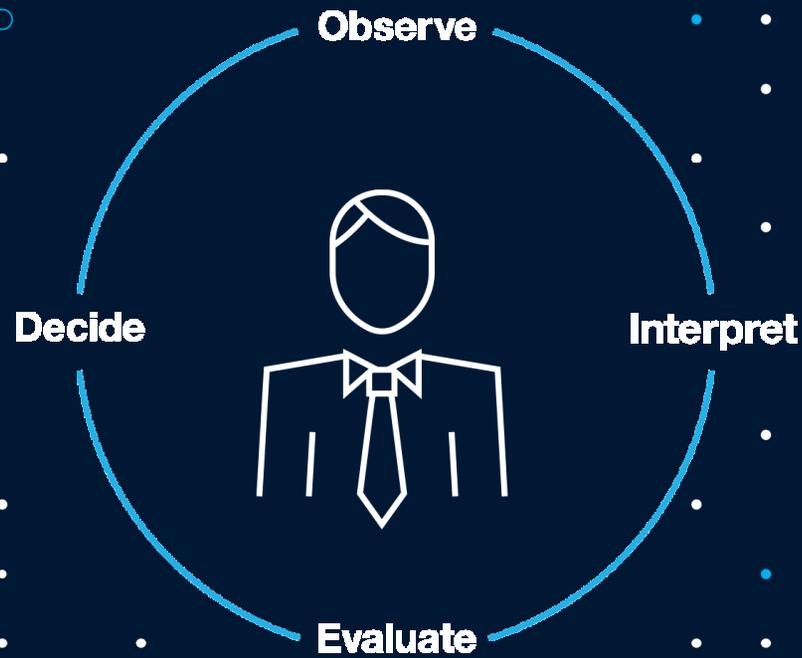
Novembre 2015



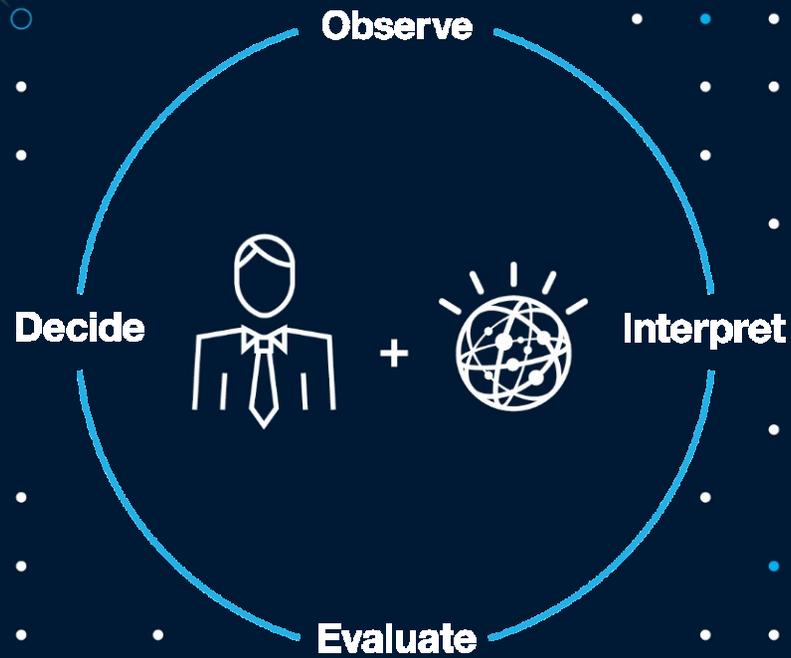
This is how cognition works.



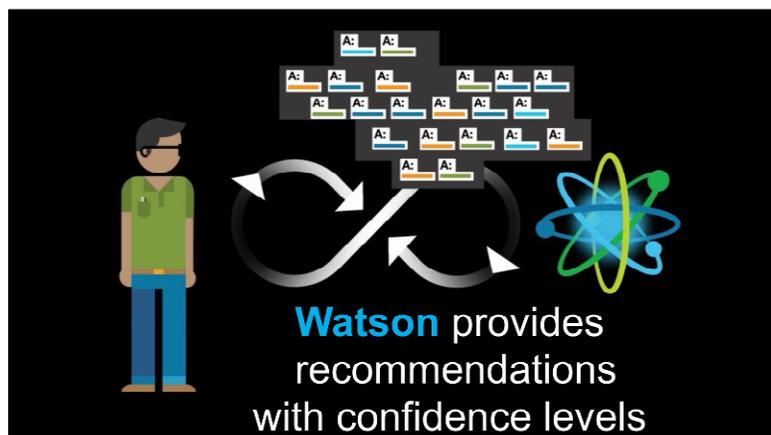
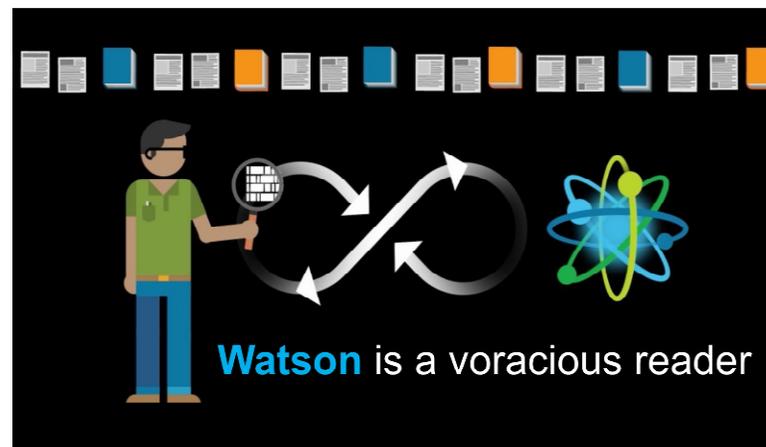
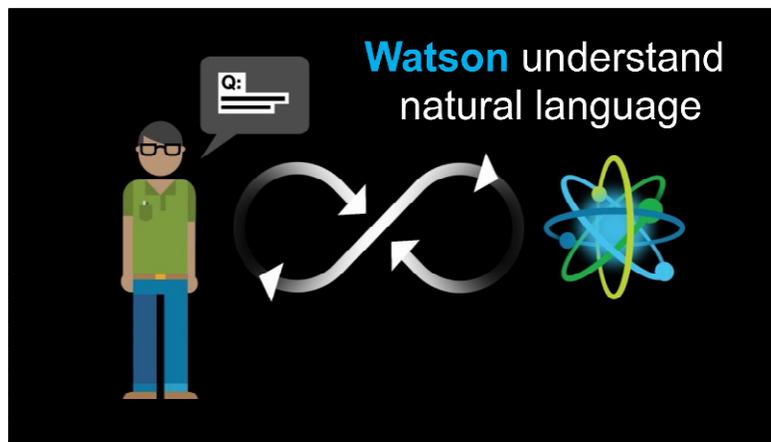
The making of an expert.



Watson scales expertise to expand what's possible.



Watson, Cognitive Computing



<https://www.youtube.com/watch?v=Xcmh1LQB9I>

IBM WATSON

These technologies draw on
five distinct fields of study:

Big Data & Analytics

Data Mining,
Optimization,
Text Analytics

Artificial Intelligence

Machine Learning,
Natural Language
Processing,
Algorithms & Theory

Cognitive Experience

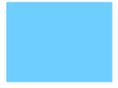
HCI, Speech,
Translation, Machine
Vision, Visualization

Cognitive Knowledge

Knowledge
Representation,
Ontologies, Semantics,
Context

Computing Infrastructure

High Performance
Computing, Distributed
Systems, Programming
Models & Tools



La donnée transforme industries et professions

■ Données de santé



Healthcare data comes from sources such as:



Patient
Sensors



Electronic Medical
Records



Test Results

+99 % en 2017

88% non structurées

ADVANTAGES OF COGNITIVE BUSINESS:

The doubling time of medical knowledge :

In 1950 was 50 years

In 1980, 7 years

In 2015, less than 3 years

While a doctor becomes board certified in

11 – 16 years

Why Watson in Healthcare & Life Sciences?

“Medicine has become too complex. Only about 20% of the knowledge clinicians use today is evidence-based.”

Steven Shapiro

Chief Medical & Scientific Officer
University Pittsburgh Medical

Medical info is doubling every 5 years

81% of physicians spend < 5 hrs / month reading medical journals

1.5M errors in the way medications are prescribed, delivered and taken

\$750B, or 30 cents of every dollar, is wasted in US alone

CONSIDER:

Data flows from every device, replacing guessing and approximations with precise information. Yet 80% of this data is unstructured; therefore, invisible to computers and of limited use to business.

By 2020,

1.7 MB

of new information will be created **every second** for **every human being** on the planet.

HEALTHCARE DATA

99% growth by 2017
88% unstructured

Healthcare data comes from sources such as:



Patient Sensors



Electronic Medical Records



Test Results

UTILITIES DATA

93% growth by 2017
84% unstructured

Utilities data comes from sources such as:



Utility Sensors



Employee Sensors



Location Data

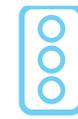
GOVERNMENT & EDUCATION DATA

94% growth by 2017
84% unstructured

Government & education data comes from sources such as:



Vehicle Fleet Sensors



Traffic Sensors



Student Evaluations

MEDIA DATA

97% growth by 2017
82% unstructured

Media data comes from sources such as:



Video and Film



Images



Audio

Cas d'usage

Oncology Advisor

Attacking the cause of
one in four deaths

IBM Watson
Oncology



Memorial Sloan Kettering
Cancer Center

Business problem:

Need better individualized cancer treatment plans

Solution:

- Suggestions to help inform oncologists' decisions based on 600K+ pieces of evidence and 2M pages of text from 42 publications
- Analyzes patient data against thousands of historical cases and trained through 5000+ Memorial Sloan-Kettering MD and analyst hours
- Evolves with the fast-changing field

Leading institutions recognize the promise of Watson.....

Ongoing Training Partner



Memorial Sloan Kettering Cancer Center.

Watson for Oncology, trained by Memorial Sloan Kettering
available in clinical use in lung, breast, colon and rectal cancer



Bumrungrad International
 HOSPITAL

Bumrungrad International Hospital
5 year agreement for Watson for Oncology

THE UNIVERSITY OF TEXAS
MD Anderson Cancer Center

Making Cancer History[®]

MD Anderson
Introduced proprietary solution with Watson for clinical use for Leukemia and Molecular Targeted Therapies

MAYO CLINIC



Mayo Clinic
Completed testing with Clinical Trial Matching for lung, breast, colon and rectal cancer

BCM[®]
 Baylor College of Medicine

Baylor College of Medicine
Published results of use with Watson Discovery Advisor – identified 7 targets for P53 activation within weeks



NEW YORK GENOME CENTER

Watson Genomics Advisor
Secured 13 Cancer and Academic medical centers for beta testing



Department of Veterans Affairs
Selected Watson to analyze EMRs in a demo project

MAYO CLINIC



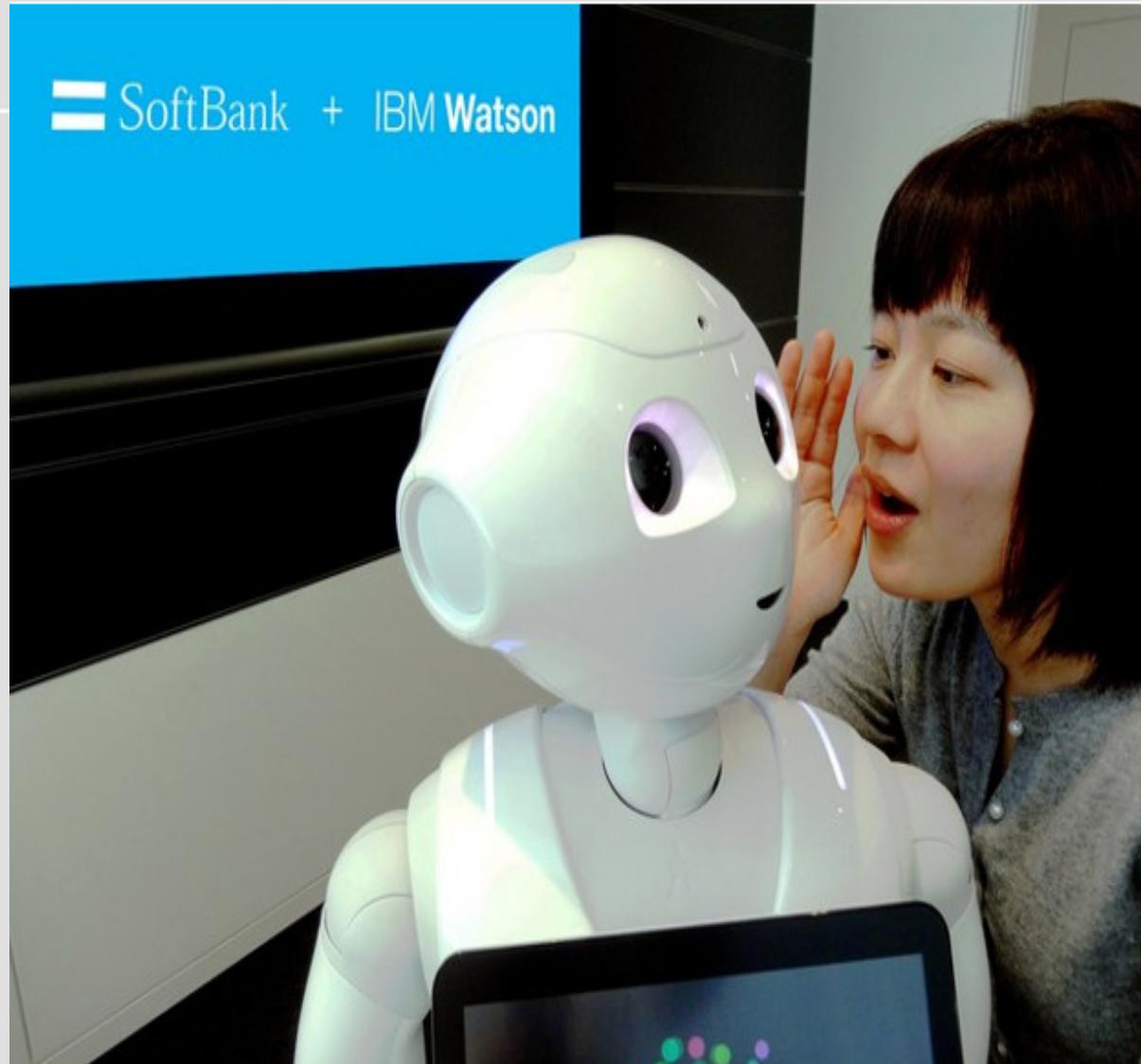
Mayo Clinic
Selected Watson to analyze EMRs for Clinical Efficiency and Effectiveness Program

Pepper Robot

Powered by Watson

IBM apprend à Watson à penser et à parler japonais.

SoftBank et IBM explorent de nouveaux usages pour Watson cognitif : interaction en langage naturel à travers une interface humanoïde





Cognitive Cooking with Chef Watson

Recipes for Innovation from IBM & the Institute of Culinary Education

Chef Watson

www.ibmchefwatson.com



The Weather company : acquisition en
cours !

www.objetconnecte.com/ibm-rachete-the-weather-company

Watson aujourd'hui

Des partenariats et des solutions métier

Finance

Bank DBS, gestion de fortunes, aide les conseillers financiers de la banque à mieux servir leurs clients

 [video youtube](#)

Ressources humaines

Aide à l'anticipation des départs, aide à l'étude de CVs

diginomica.com/2015/03/17/hire-people-ibm-watson-speaks-personality

Juridique

Ross l'assistant avocat à l'université de Toronto

 [video youtube](#)

Education

Guinnett County Public school, personnalisation du suivi des étudiants, augmentation du taux de succès

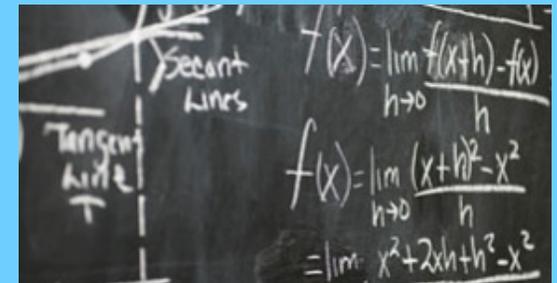
www-03.ibm.com/press/us/en/pressrelease

Watson University program

- Des cours en présentiel et en ligne
- Des Hackathons
- Des cas d'usage, « Ross l'avocat »
- En France ...



Centrale Supélec
Ecole 42
Ecole Polytechnique
HEC Paris



Pour plus d'informations:

www.ibm.com/smarterplanet/watson-university

Utilisez Watson Analytics

La page d'arrivée de Watson Analytics est la page à partir de laquelle vous pouvez commencer à explorer vos données.

The screenshot shows the Watson Analytics dashboard. At the top, there is a navigation bar with a 'Welcome' message, a user profile for 'John Colthart', and a 'Hide Panel' button. The main content area is divided into four colored panels: a dark blue panel on the left with a 'Learn more about Watson Analytics' section and a 'Play video' button; a light blue panel for 'Explore' with a circular icon and text about visualizations; a green panel for 'Predict' with a circular icon and text about predictive insights; and a purple panel for 'Author' with a dashboard icon and text about creating interactive dashboards. Below these panels is a search bar with the text 'Type in keywords to find assets' and icons for 'Add', 'Filter', and 'Sort'. At the bottom, there is a row of six asset cards: 'Social Media Analytics' (Exploration), 'Sales Results by Product Category' (Prediction), 'Lead Generation' (View), 'Load your data' (Tutorial), 'Create an exploration' (Tutorial), and 'Create a prediction' (Tutorial).

www.ibm.com/software/products/fr/watson-analytics

... même Bob Dylan ...



[Lien youtube](#)

**... de la part des professeurs
représentant le Pôle santé ...**

Pôle 1
Industry Solutions center D'IBM
« salle santé »

14 & 15 janvier 2016

L'hôpital, une organisation impactée par la transformation digitale de même que les entreprises de tous les secteurs et l'éducation

▪ Impact sur tous les processus

Relation entreprise client

Systèmes de gestion

Modalités recrutement / formation

Processus de travail / production

Relations entre collaborateurs

▪ Transformation digitale

Personnalisation des relations / solutions

Travail à distance

Travail collaboratif

Plateformes d'échange

Besoins en compétences « numériques » et profils adaptés aux modalités de travail

La santé, secteur précurseur en Big Data , IA / informatique cognitive

Passage des objets connectés aux services connectés

■ Des opportunités dans tous les secteurs

Santé : recherche, aide au diagnostic, applications mobiles pour suivi des patients

Mais aussi

Météorologie

Energie

Industrie

Commerce

Tourisme

Transport

Assurance

Banque

■ et pour les spécialités de l'éco-gestion

- **RH**

Recrutement,

Gestion des ressources , Gestion des talents...

- **Mercatique / vente / commerce**

Connaissance client

Géolocalisation

Ciblage ou reciblage publicitaire

Innovations basées sur le recueil de données

Tarifification

- **Finance**

Analyse des risques,

Fast et smart trading, détection des fraudes

- **Emergence de nouveaux métiers**

Nécessaire développement des compétences des lycéens et étudiants de BTS

Utiliser le digital en confiance : outils et risques maîtrisés

- Travail à distance
- Environnement numérique
- Travail collaboratif

L'enseignement voit ses pratiques modifiées

- Classe inversée
- ENT (Educ'horus, Pronote, lillie)
- MOOC (FUN, Khan academy, Coursera...)
- Jeux sérieux en ligne
- Plateformes de formation individualisée (Voltaire...)

Comprendre les organisations digitalisées

- Management
- Sciences de gestion / information et intelligence collective
- Economie-droit
- Systèmes d'information de gestion
- Ressources humaines et communication
- Gestion et finance (PGI...)
- Mercatique (SIM...)
- Gestion de la relation client

Quelques articles récents sur le sujet

- Vieillesse, des tablettes contre Alzheimer **La gazette santé social** 23 octobre 2015
- Intelligence artificielle : psy, prof ou consultant, Watson le fait pour vous **L'OBS** 11 septembre 2015
- Un robot capable d'émotions n'est pas exclu. **La Tribune** 1^{er} janvier 2016
- L'abondance et les inégalités, piliers du futur numérique. **Les Echos** 18 septembre 2015
- Interview Axelle Lemaire Secrétaire d'Etat chargée du Numérique **Les Echos** 6 janvier 2016
- La French Tech abat ses cartes à Vegas **Les Echos** 6 janvier 2016
- Les groupes de CAC 40 se dotent d'un « Monsieur digital » **Les Echos** 8 janvier 2016
- Quand la vieille économie française fait son show à Las Vegas **Les Echos** 8 janvier 2016
- France, le virage numérique **Les Echos** 28 décembre 2015