How Intelligent Virtual Agents Will Transform Customer Experience

Stephen P. Hoover
CEO
PARC, a Xerox Company

WORK CAN WORK BETTER™

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Xerox today: Engineering the Way the World Works…

Xerox Today

We help businesses and governments, big and small, improve the way they work to achieve better outcomes.

We are a diversified business services company.

We remain a leader in document management and managed print services.

And, we are also a leader across a range of business and government operational segments like customer care, healthcare services, transaction processing and transportation.

- Clients include 90% of the Fortune 100
- Founded in 1906
- Presence in 180 countries
- Over 130,000 employees worldwide
- Annual revenue over $19 billion, more than 50% from business services

Touching Lives Every Day

60 billion

Managing 60 billion printed pages per year

12 million

Processing over 12 million credit card applications annually

1+ billion

Processing 1+ billion claims transactions annually

$5 billion

Collecting $5 billion in electronic tolls annually

3 million

Supporting 3 million learners around the globe

2.5 million

Answering 2.5 million customer interactions daily

2 out of 3

Touching 2 out of every 3 insured lives in the United States

1,700

Supporting more than 1,700 country, federal, state and local governments

200 million

Delivering 200 million pieces of in-store marketing materials annually

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PARC LEGACY

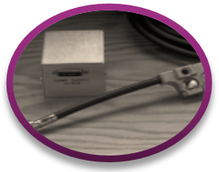
A storied history of inventing the future

1970 Xerox PARC

1971 Laser printing

1973 PC - Alto

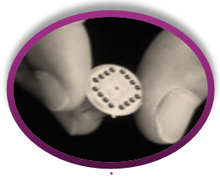
1973 Ethernet



1975 WYSIWYG GUI

1980 Programming languages

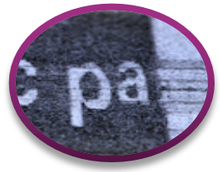
1986 Multi-beam lasers



1988 Ubiquitous computing

1997 Blue laser

2000 Electronic reusable paper

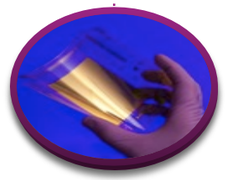


2001 Biomedical systems

2002 PARC, a Xerox Company

2012 Energy

2013 Printed, Flexible electronics



2014 Content-centric networking

$60 billion

start-ups & spin-offs

Over $1 trillion

new industries

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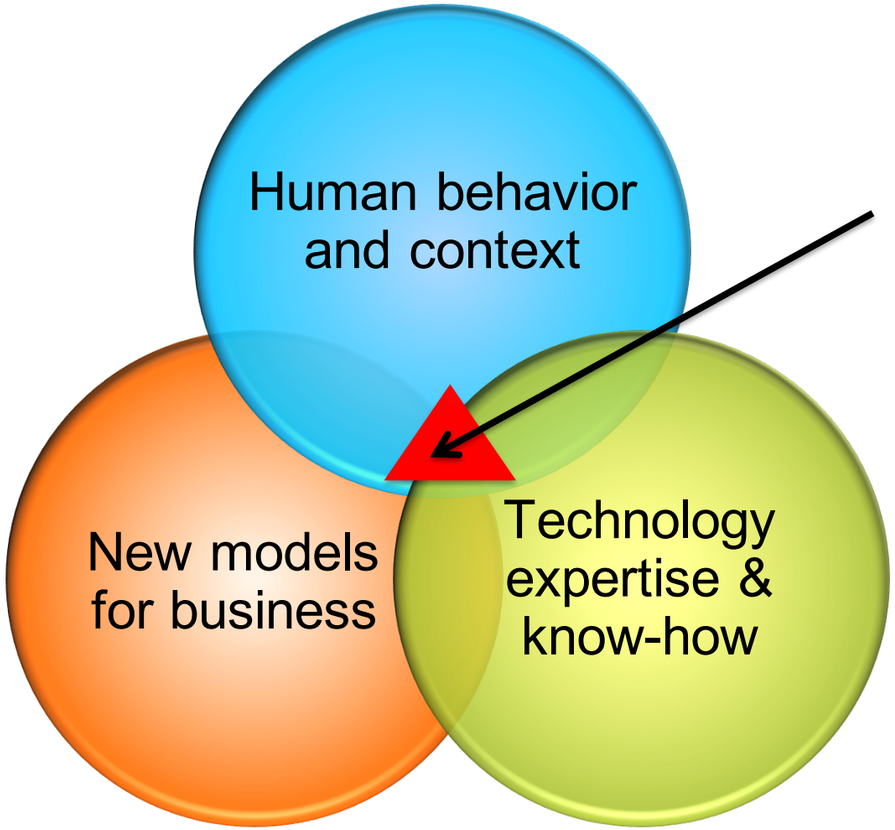
Successful Intelligent Agents will require more than good technology



Transformational innovation requires all three

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What happens when you don’t put the person first…

Agent Orange or Clippy? Which was worse??

TIME Subscribe

The 50 Worst Inventions

From the zany to the dangerous to the just plain dumb, here is TIME's list (in no particular order) of some of the world's bright ideas that just didn't work out

Like 1.4k Tweet 25 G+1 74 Share 31

WORST INVENTIONS

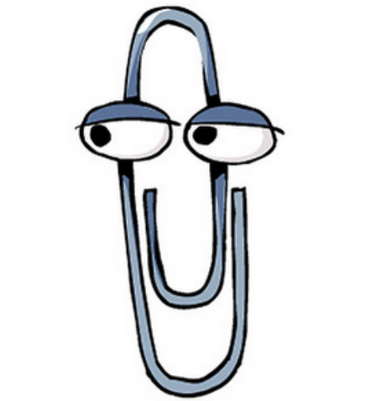
Clippy

3 of 50

VIEW ALL

By Chris Gentilviso | Thursday, May 27, 2010

"It looks like you're writing a letter. Would you like help?" No question drew more ire from Microsoft Office users than Clippy's snappy opener. The assumption-prone office assistant made its debut in Microsoft Office 97 as an acrobatic virtual paper clip ready to help complete any task. The only problem was that Clippy had trouble holding its tongue. As soon as the word *Dear* hit the page, it burst into letter-writing mode, ready to help structure a person's most private thoughts. Clippy no longer stars in a lead role for the word-processing program, mainly because of its obsession with bouncing on users' documents and the fact that, well, nobody seems to write letters anymore.



NEXT Agent Orange

Source: Time Inc.

So, what makes a good virtual agent?

- **It should understand:**
  - The system
  - You
  - Context
  - How to interact with you naturally
  - How to adapt over time

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System model

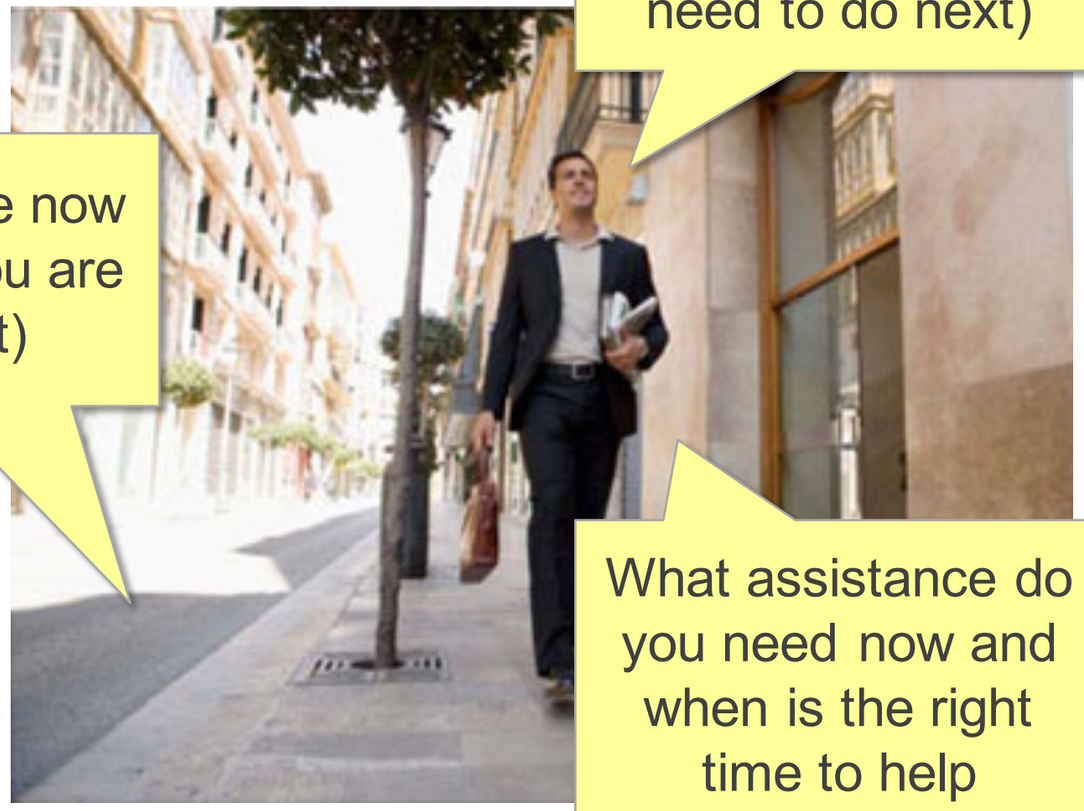
Understand how systems operate to diagnose problems and understand cause/effect and cost/benefit of actions.

User model

Understand the individual's preferences and personality to provide the right help in the right way.

Context

Understand context including time, location, activity, and intent to provide the right help at the right time.



Natural interaction that adapts over time

Engage in a conversation that builds understanding over time, not just a series of point notifications.

Why can we make better virtual agents now?

The coming waves of technology change

Internet of Things: embedded and connected intelligence

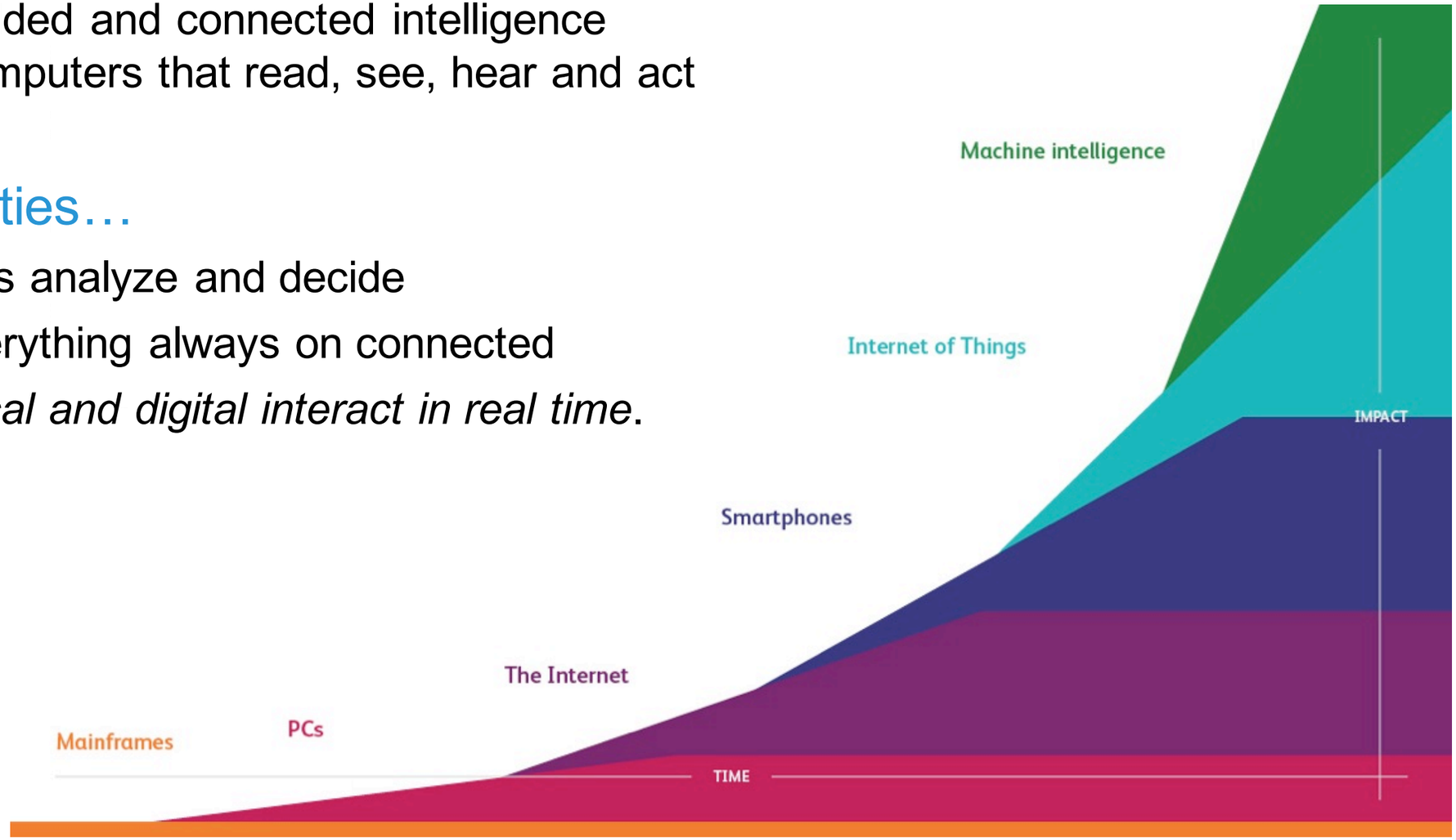
Machine Intelligence: Computers that read, see, hear and act

…create new capabilities…

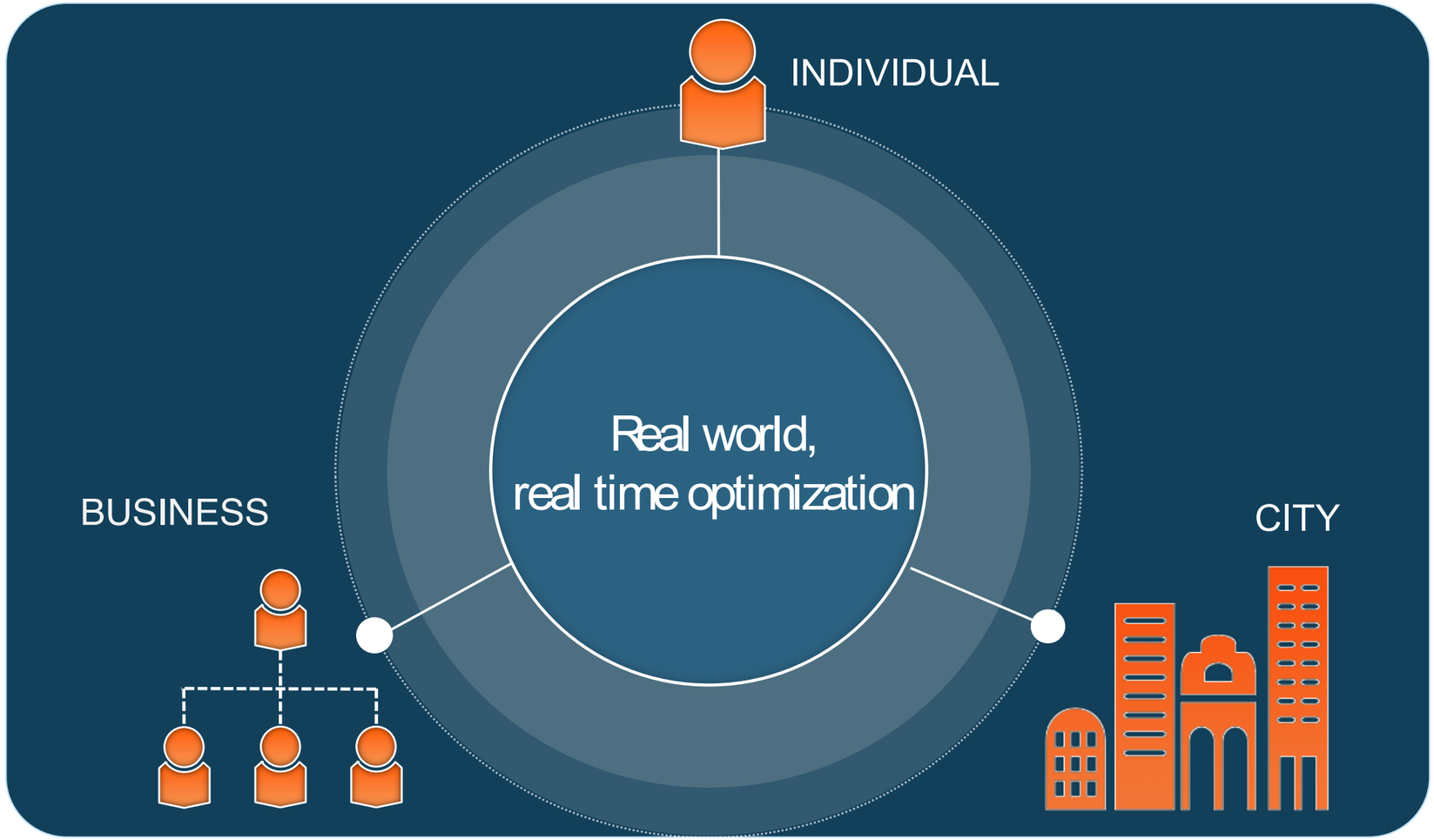
Context Aware: Computers analyze and decide

Ubiquity: Everywhere, everything always on connected

More and more the physical and digital interact in real time.



Enabling personalized real world, real time optimization



Intelligent agents will transform the customer experience

"The future is here - it is just not very evenly distributed." - William Gibson

We're seeing early examples already:

Automated customer care that learns from past successes and failures to diagnose and resolve problems.

Xerox Virtual Agent

Source: WDS, a Xerox Company

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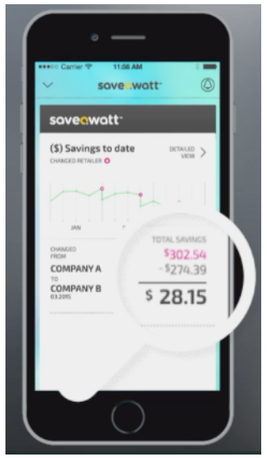
We're seeing early examples already:

MyWave puts the customer first to manage the relationship with a brand



Source: MyWave

MyWave's Frank

Digital signage tailored to customer demographics, time of day, day of week, geographic location and other attributes.

Xerox Digital Signage

Intelligent agents will transform the customer experience

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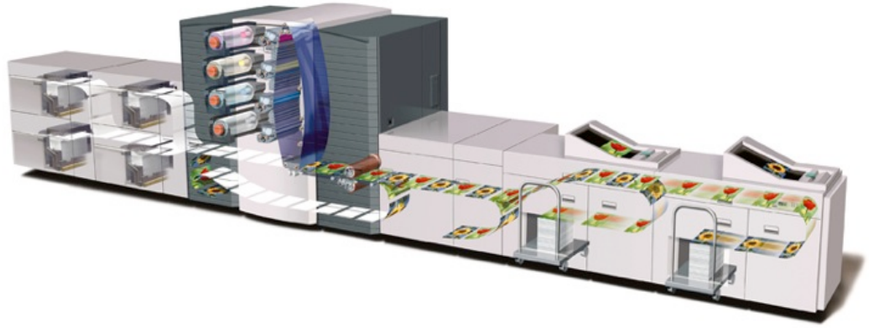
We're seeing early examples already:

Proactive assistants and self-healing products.

Remote configuration and updates

Intelligent devices with embedded prognostic capabilities to self-repair.



- 40% better uptime than competitive presses

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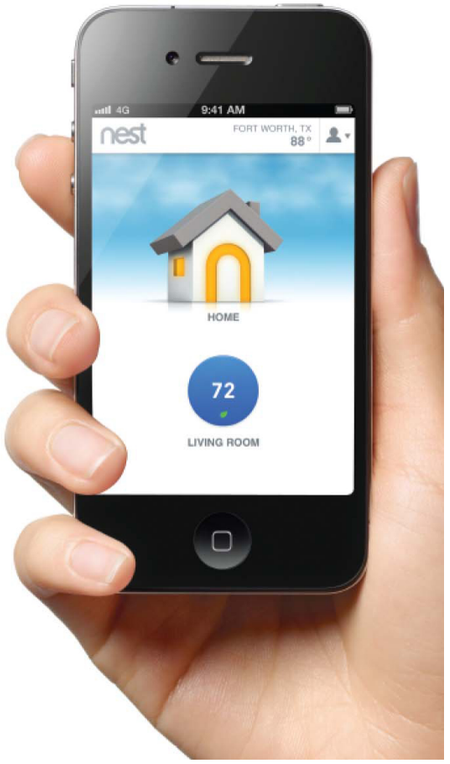
Intelligent agents will transform the customer experience

"The future is here - it is just not very evenly distributed." - William Gibson

We're seeing early examples already:

Connected products that sense and adapt to our personal usage and environments.



Source: Nest

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The next wave in intelligent assistants:

Moving from a series of point-wise interactions to collaborative task-based problem solving

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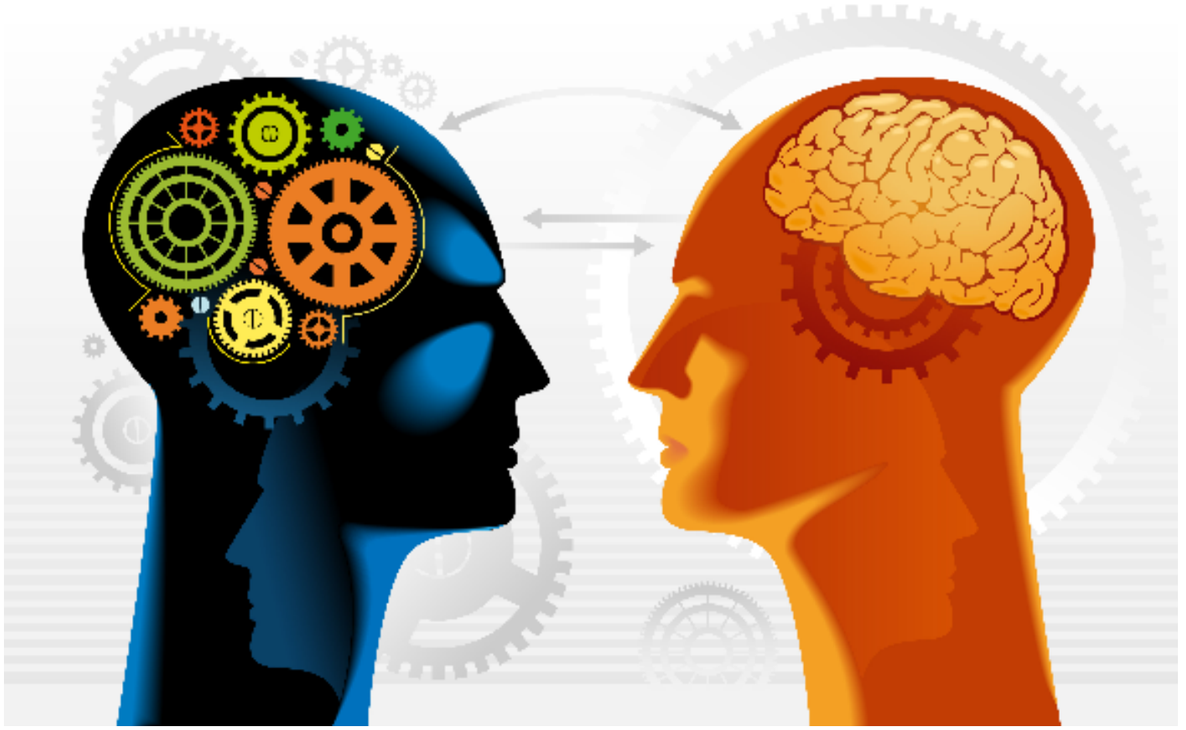
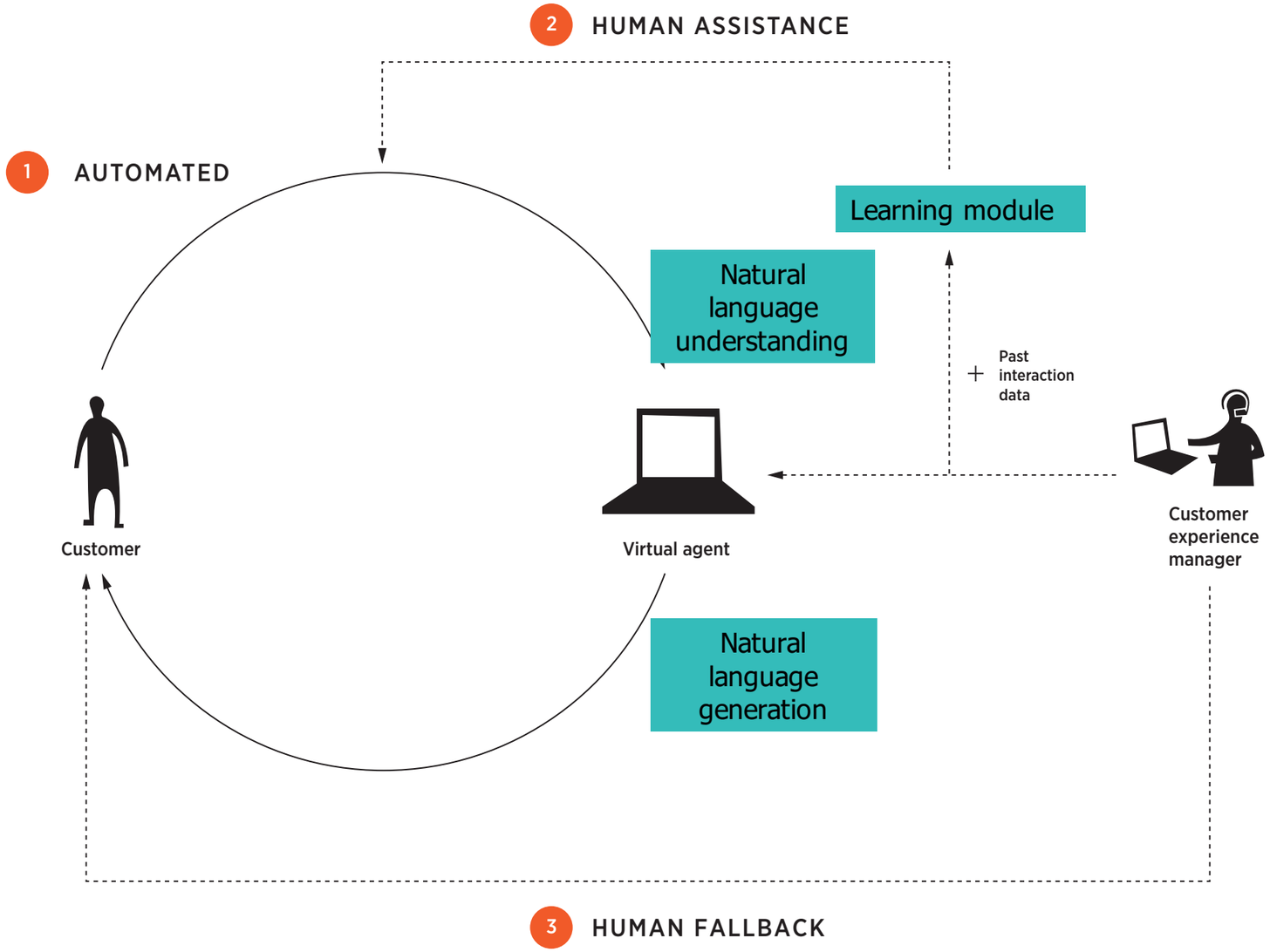
Interacting Naturally: Building understanding through conversation

- Create a shared understanding between the system and user
  - Using both natural language and affect
  - and a set of models that represent and understand both the state of the system and the user's history of actions
  - and that dynamically adapts & learns over time



Adapting & learning over time and happy customers

Automated learning with graceful failover to humans



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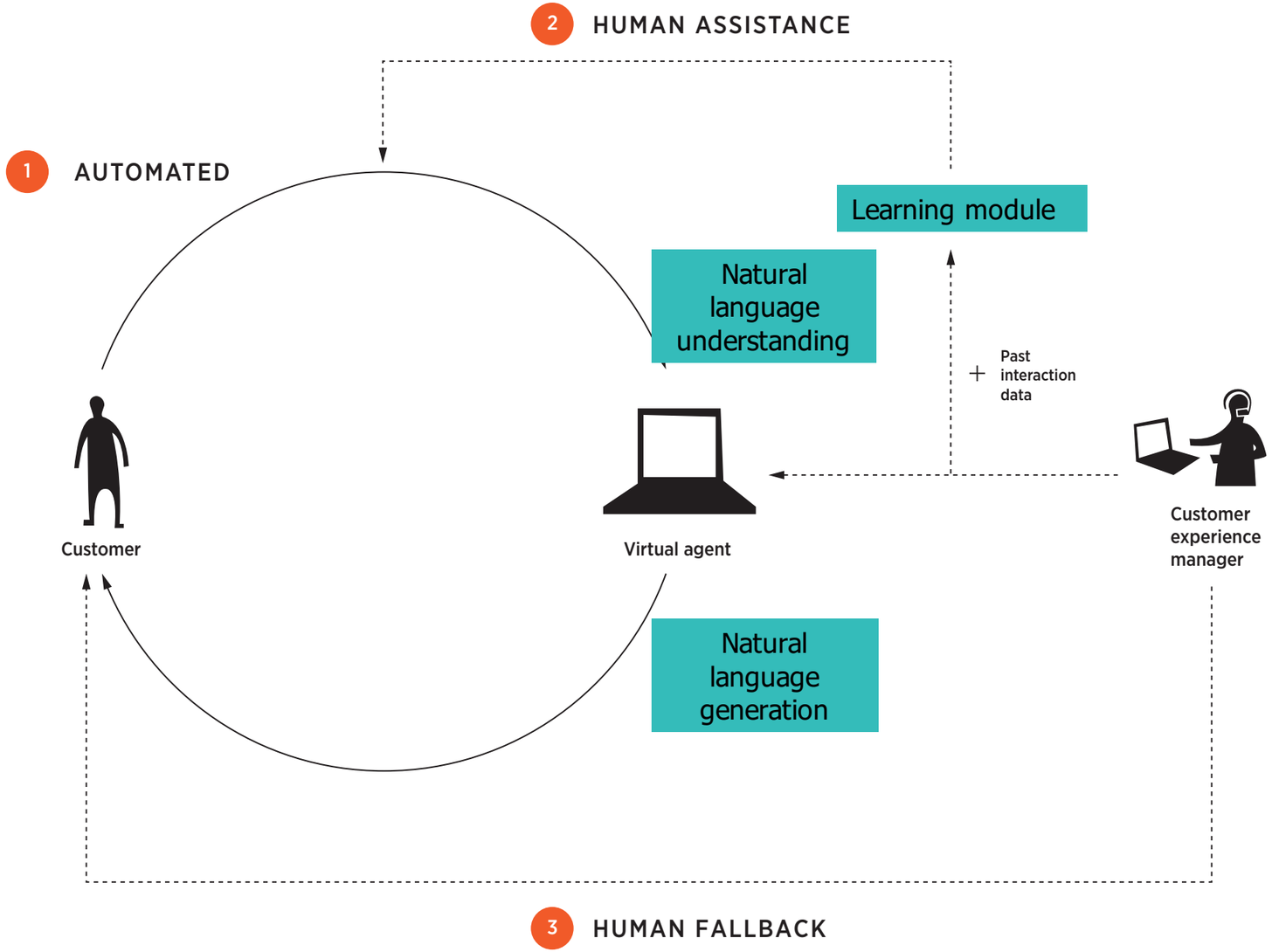
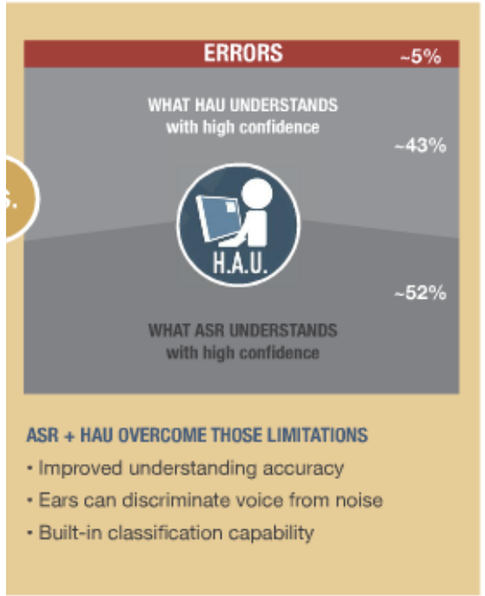


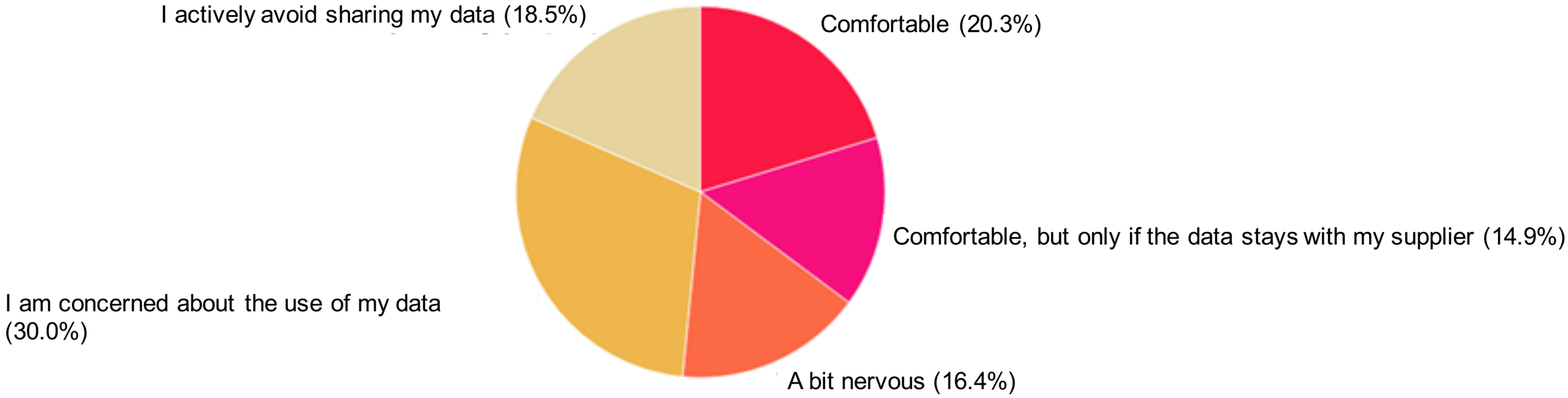
Interactions ™
Human Assisted Understanding



Facebook M

Interacting Naturally: Building trust and respecting privacy

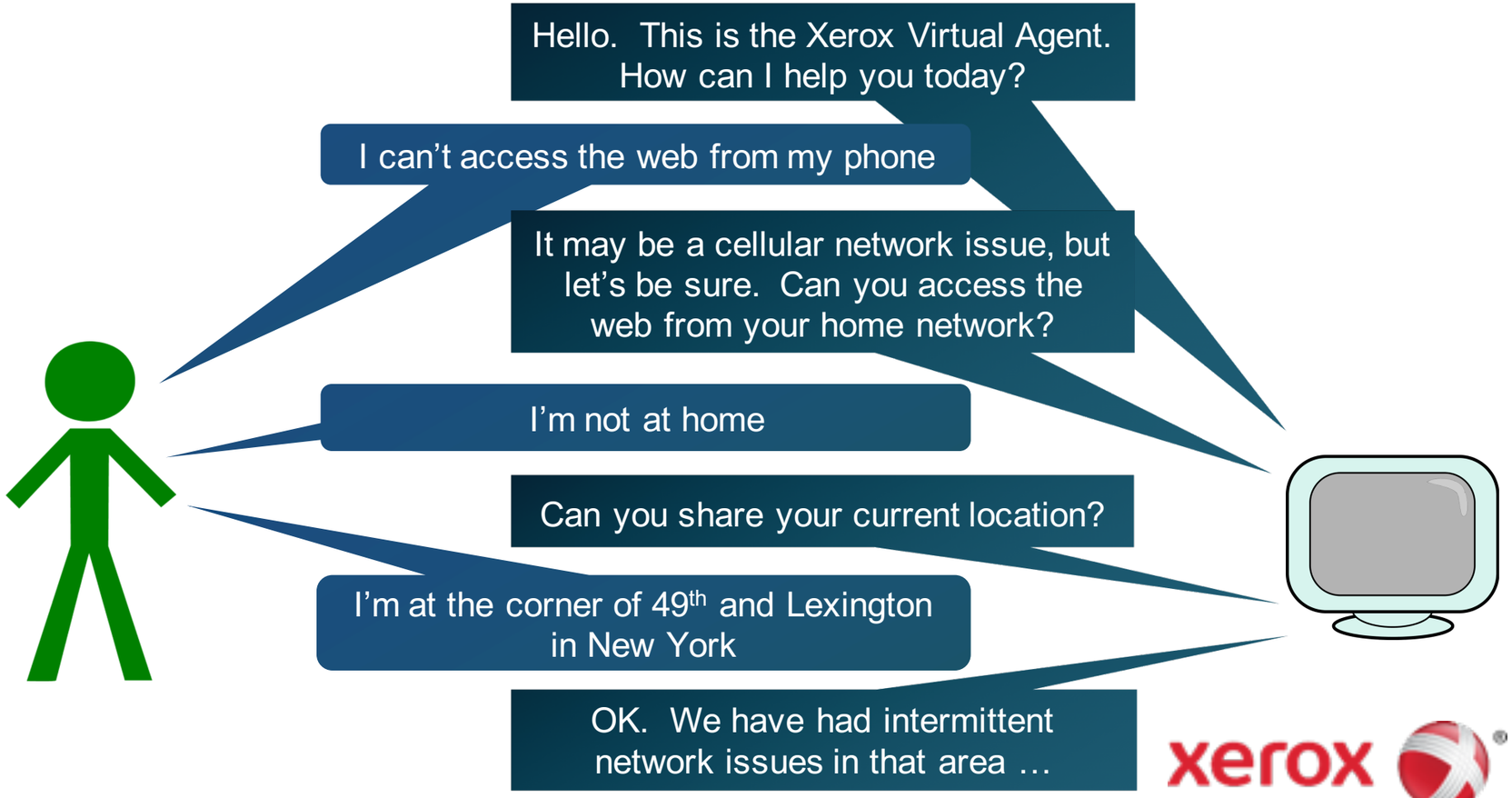
› "How comfortable are you with your suppliers using the data they have about you to communicate and adapt their products and services to you?"



Source: Preview data from "The State of Customer Service 2015, Xerox."

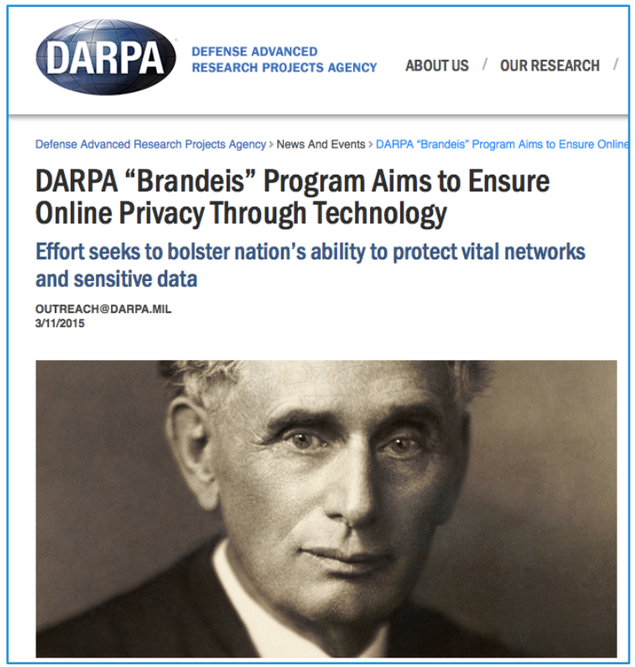
Interacting Naturally: Building trust and respecting privacy

- Use conversation to build trust, where users reveal more personal information over time as they get more value.

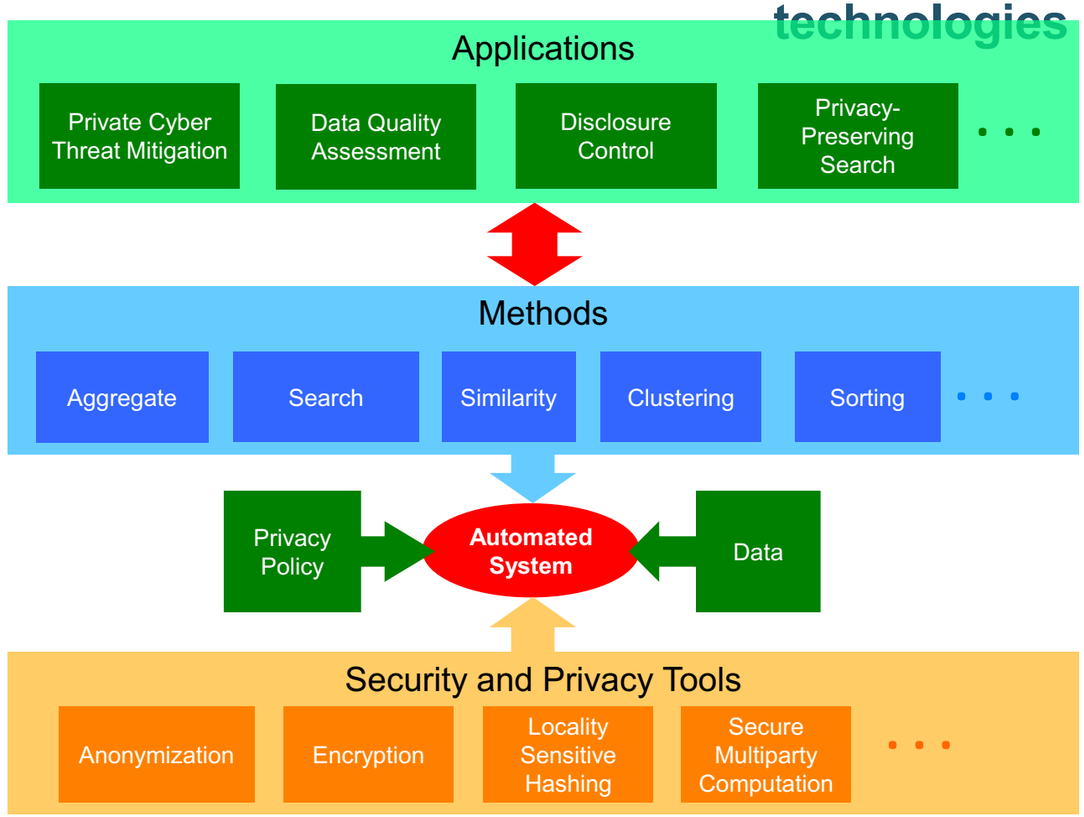


Understanding Context: Preserving your privacy by performing analytics on encrypted data

- Developing new analytical techniques that can operate on encrypted data to create privacy preserving analytics

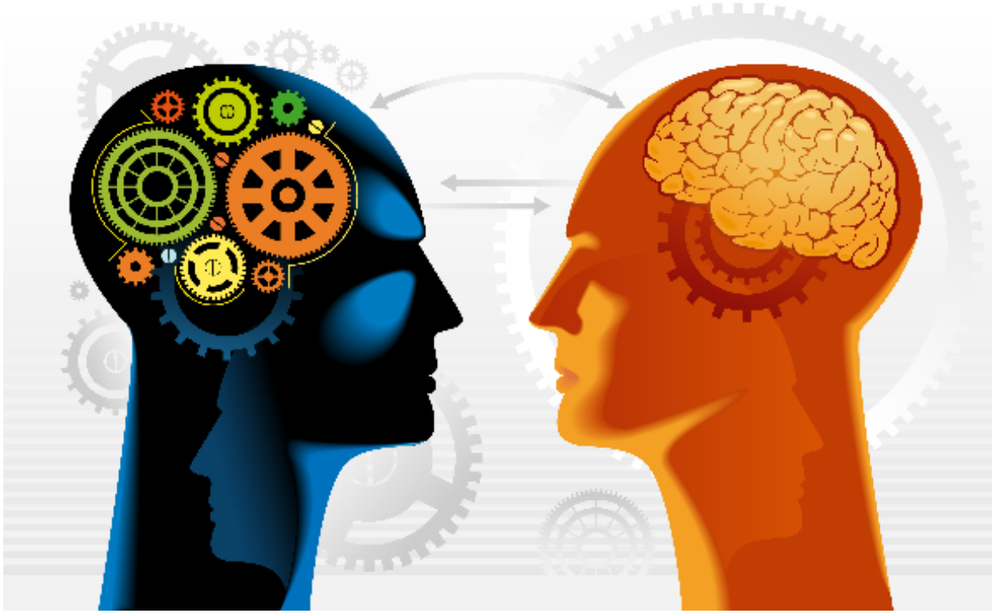


PARC's model for future privacy technologies



Summary: What is the next wave in intelligent assistants?

- **An intelligent agent that works with you in collaborative task-based problem solving and understands:**
  - The system
  - You
  - Context
  - How to interact with you naturally
  - How to adapt over time

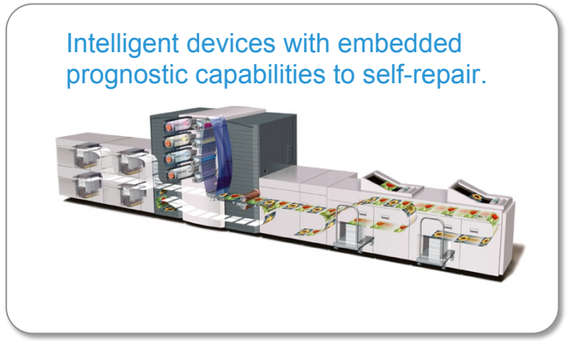


“The future is already here — it's just not very evenly distributed”

- We can see intelligent agents in a variety of ways

Intelligent agent based products
Nest Thermostat

Learning from humans
Xerox Virtual Agent



Proactive assistants and self-healing products.
Xerox Digital Press

- But our job is not yet done, we need to continue to develop
  - Technologies and user interaction models for collaborative task-based problem solving
  - Human augmented computational cognition
  - New ways to build trust with users
    - Create analytics and contextual awareness models that preserve privacy

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