

Rochester Institute of Technology
Vignelli Center for Design Studies

Design Conversations Lecture Series
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Designing Within Systems

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Presentation posted at
presentations.dubberly.com/RIT.pdf

Design practice is evolving.

From using computers as tools...



... and then as a medium.



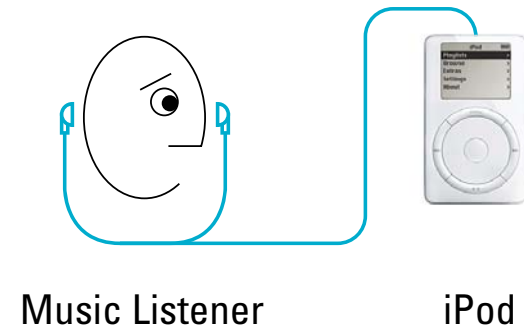
To using computers as a distribution channel...



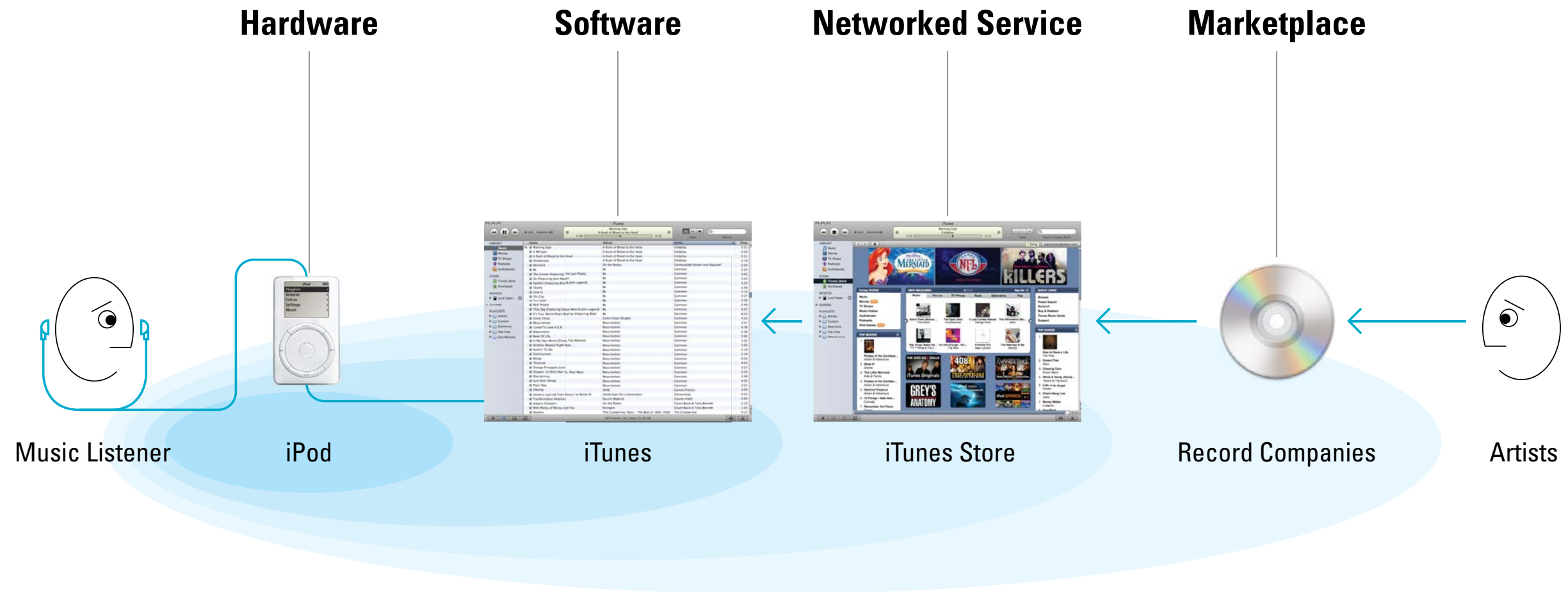
... with web-sites adding features and becoming web-apps.



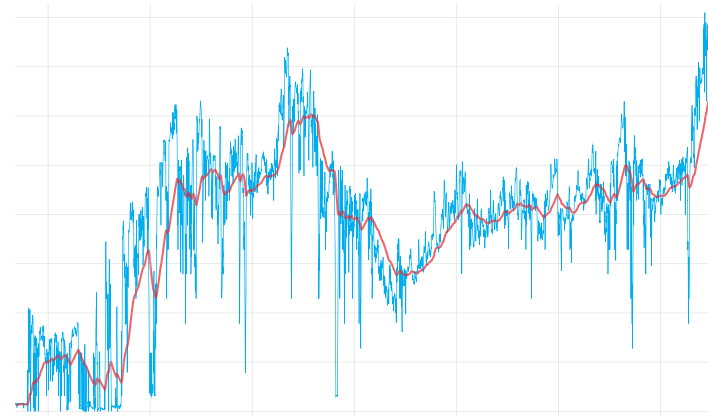
To mobile devices providing access anywhere...



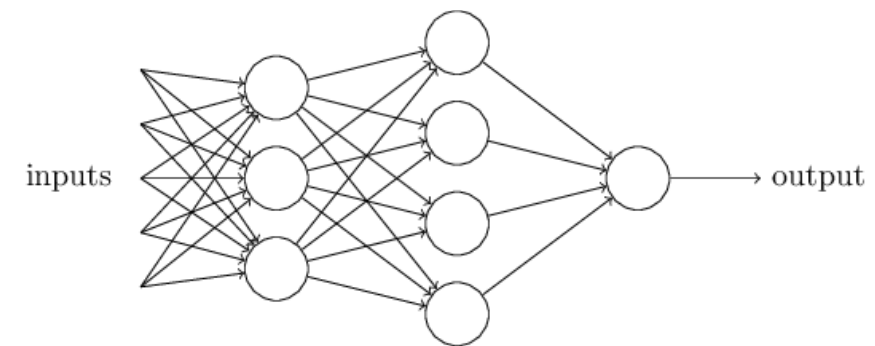
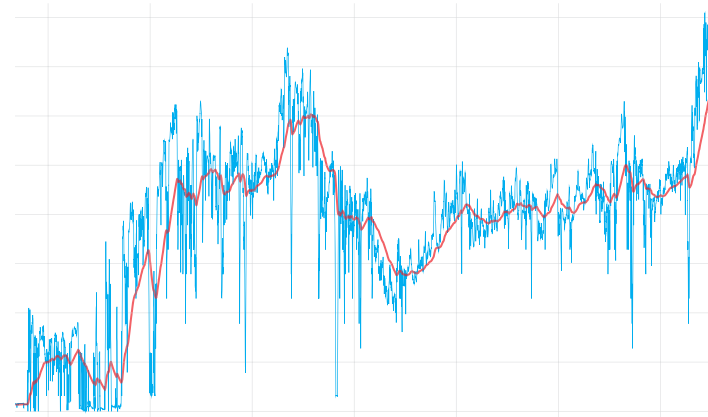
... and mobile apps connecting to networked services.



Now, smart-connected products are producing a growing tide of data...



... and machine intelligence is using the data to make predictions.



These changes are additive; the computer is...



tool
medium



channel
application



smart-connected product
bridge to service system



source of big data
machine intelligence

My practice has evolved, too.

From

graphic design

to

multimedia development + website design

to

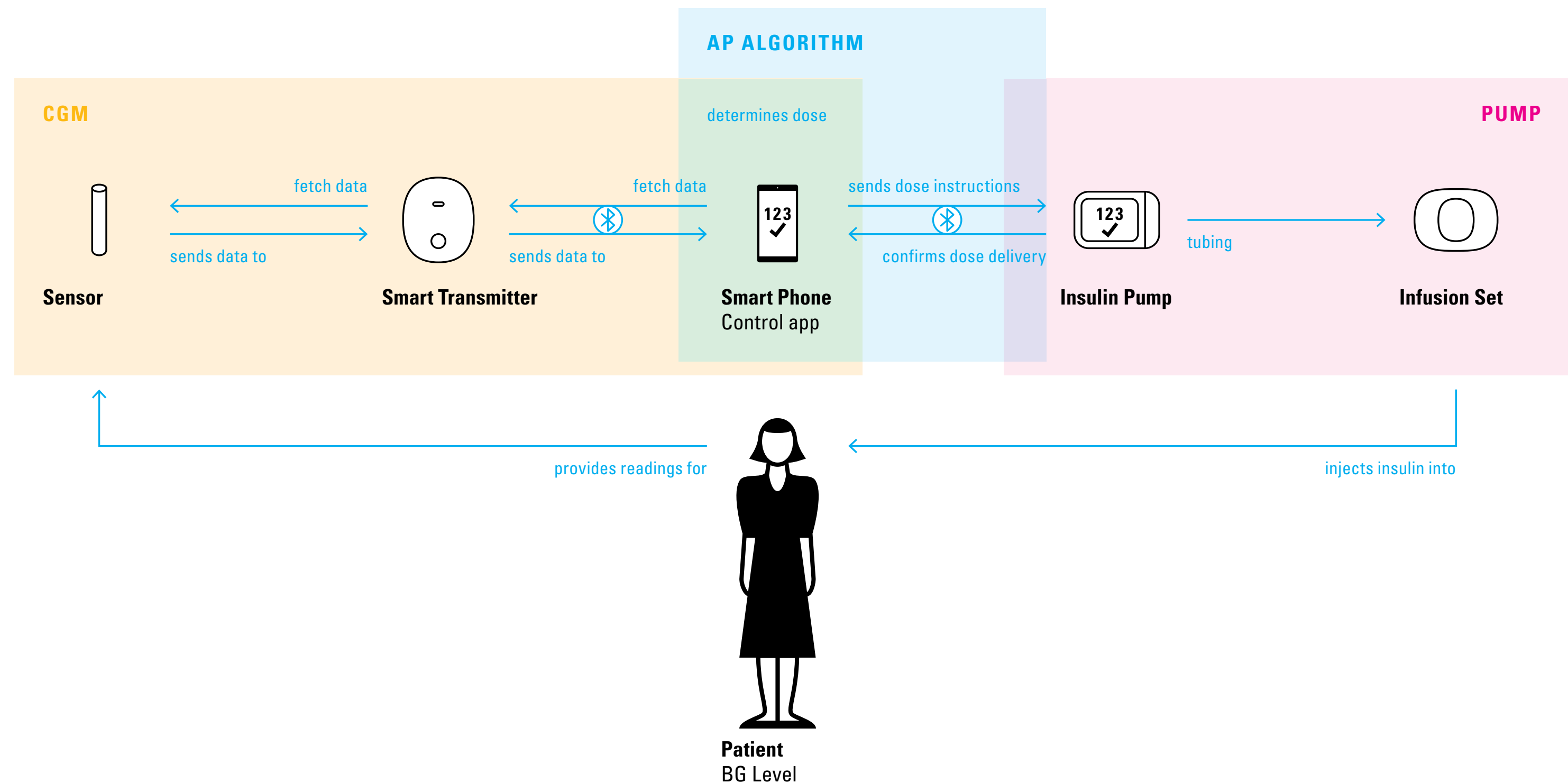
UI/UX for web apps + desktop apps + mobile apps

to

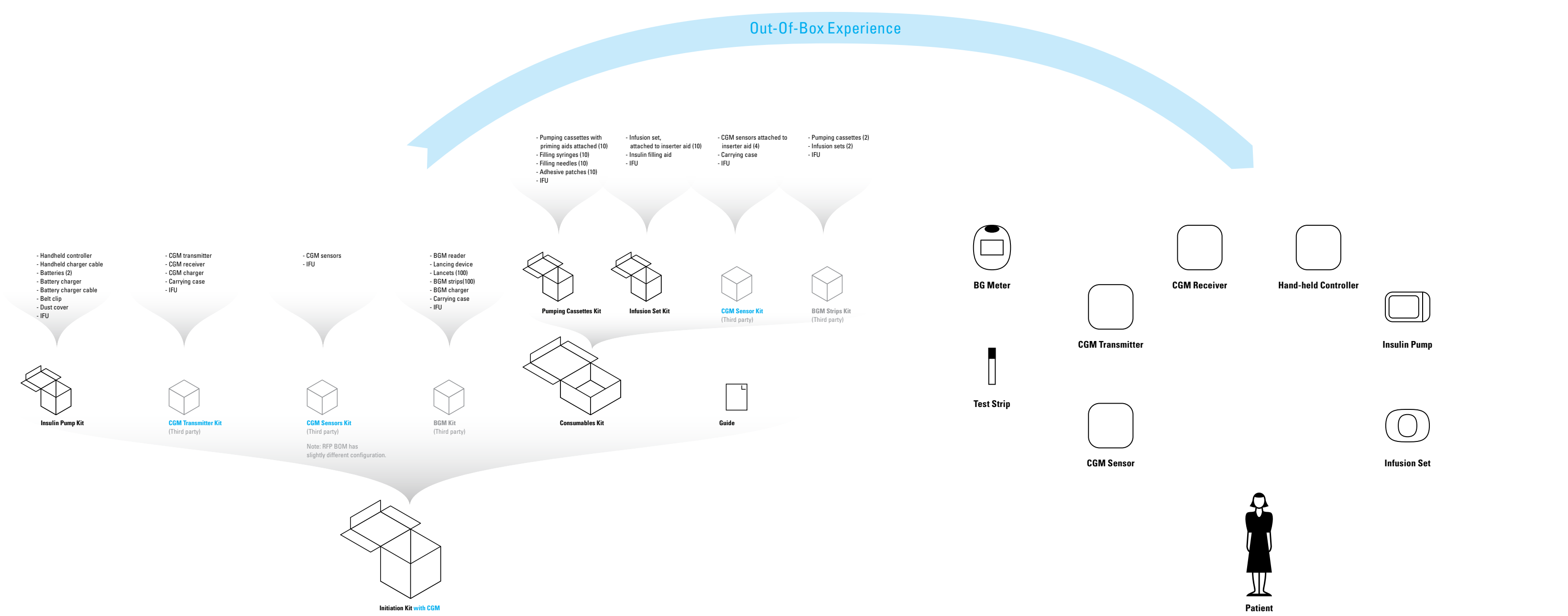
service design + systems design

Some examples of designing within systems.

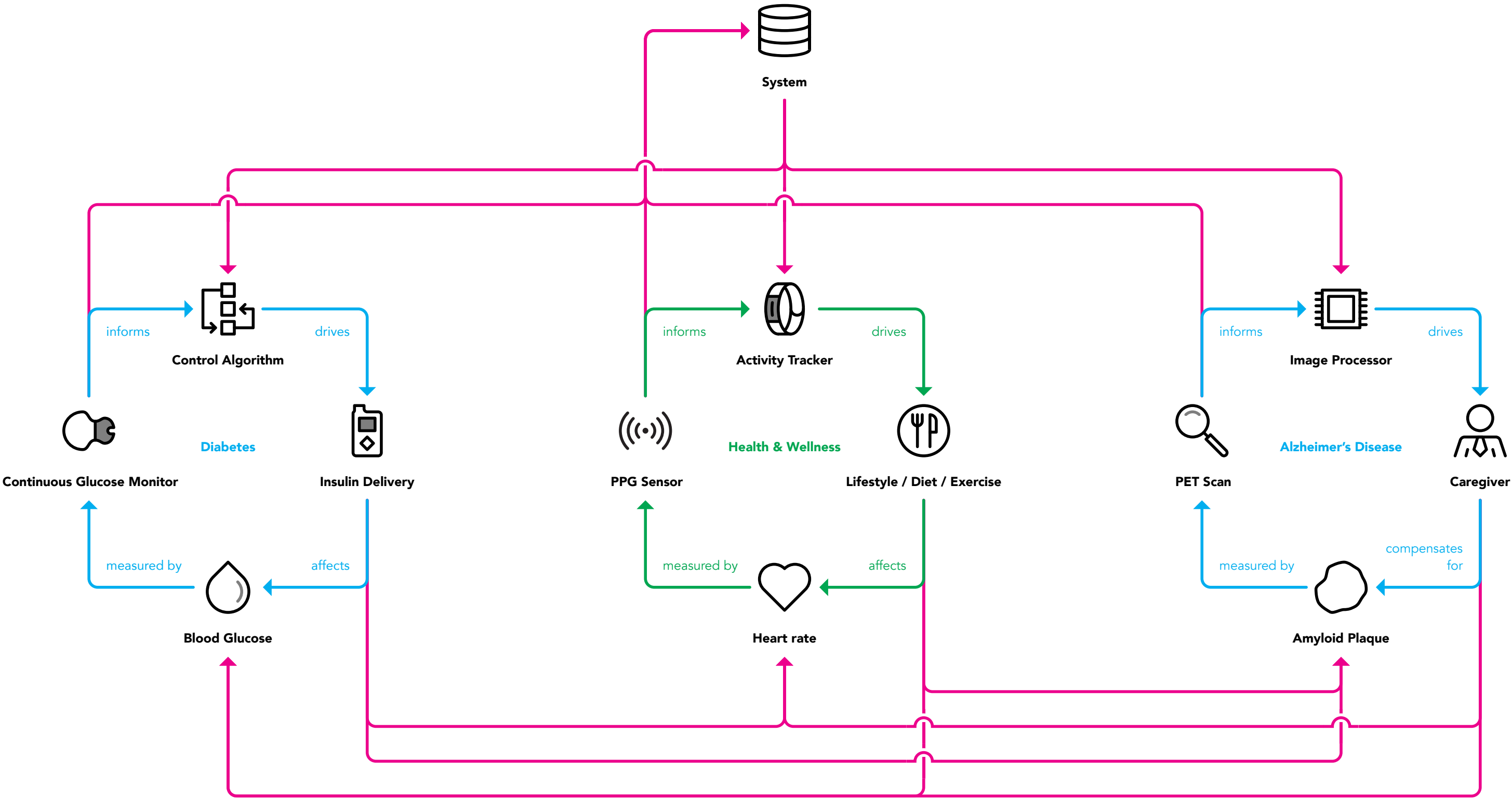
Blood glucose + insulin management systems for diabetes patients— an “artificial pancreas.”



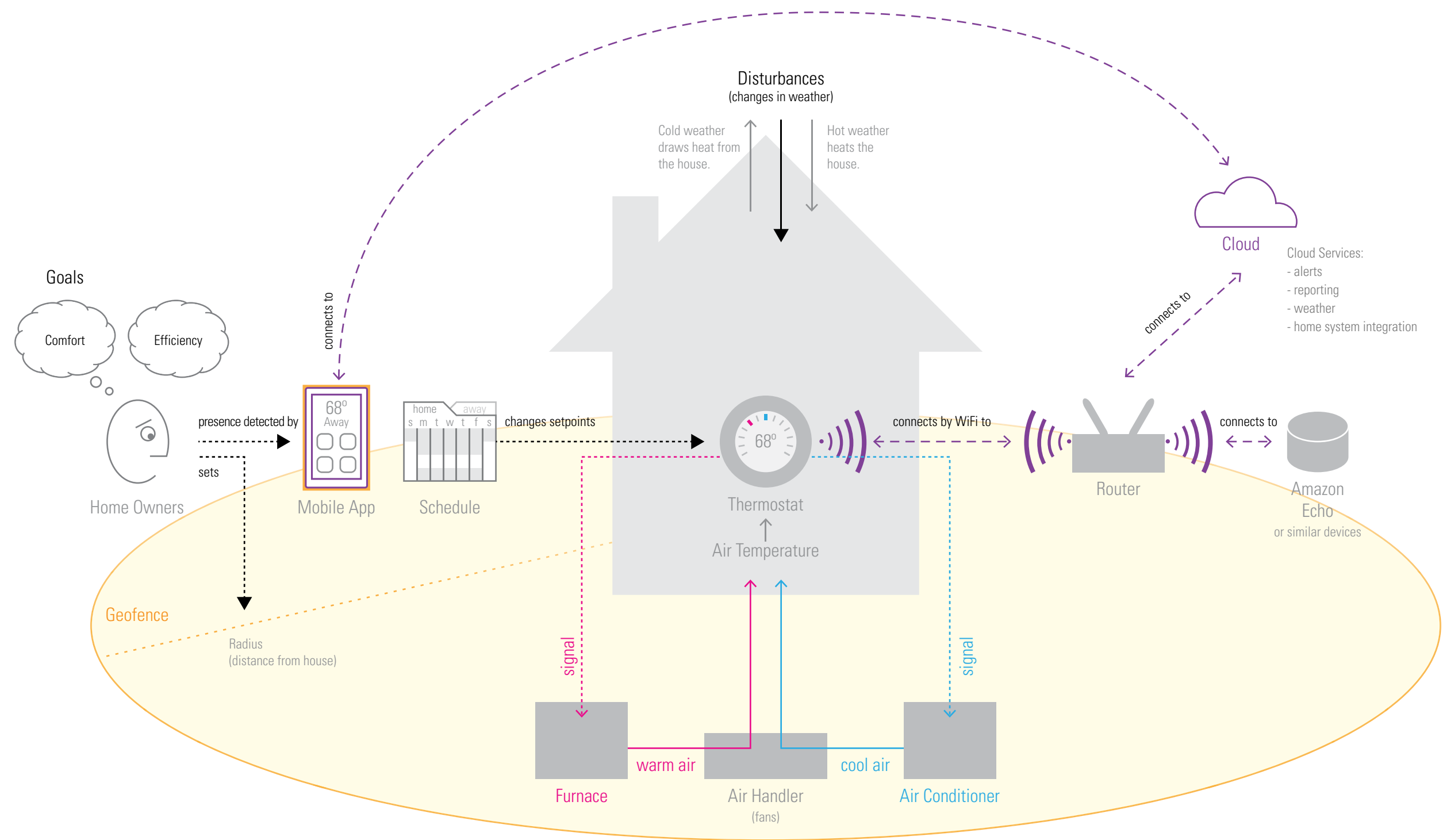
Product delivery and set-up systems—the “out-of-box-experience.”



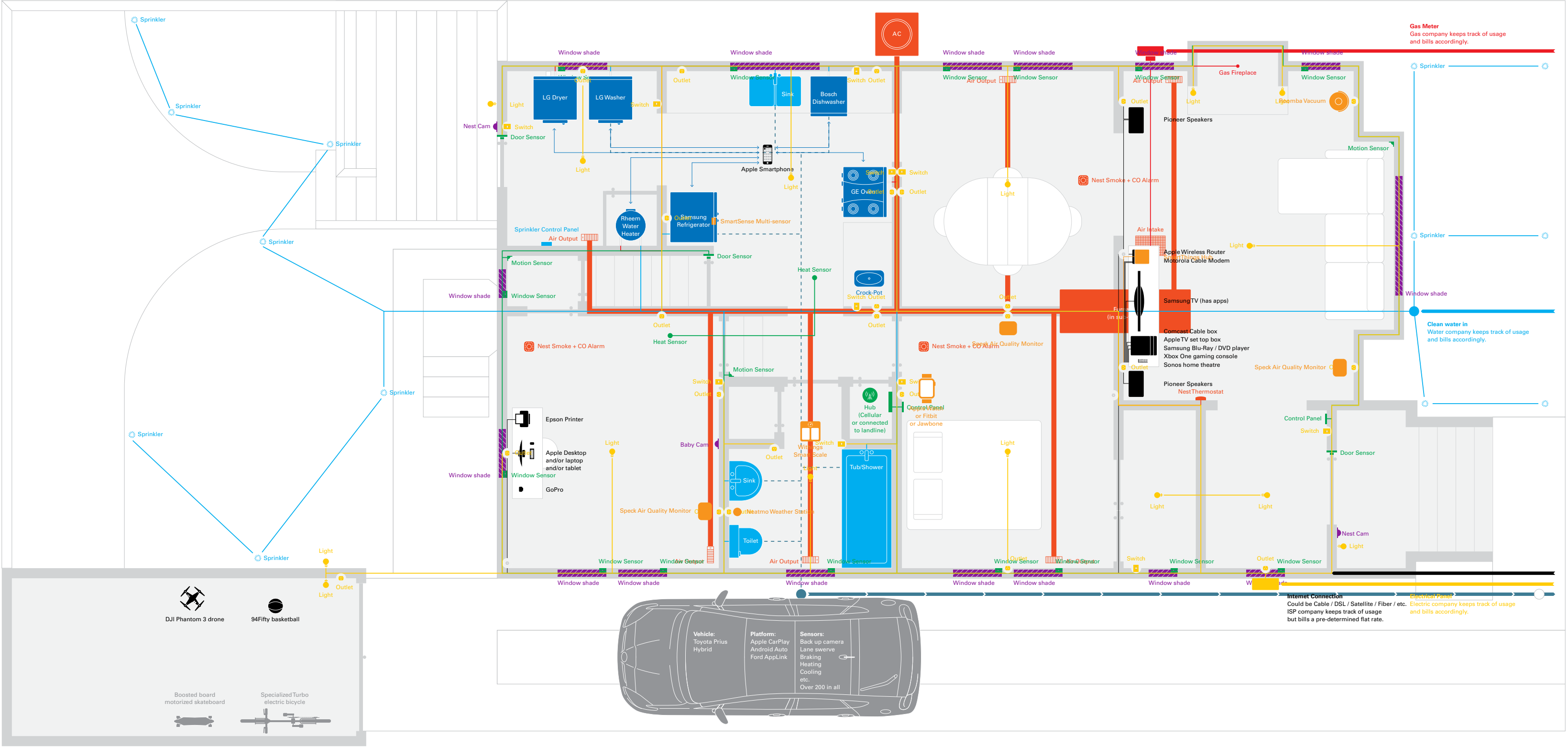
Integration of individual disease management systems in a larger ecology.



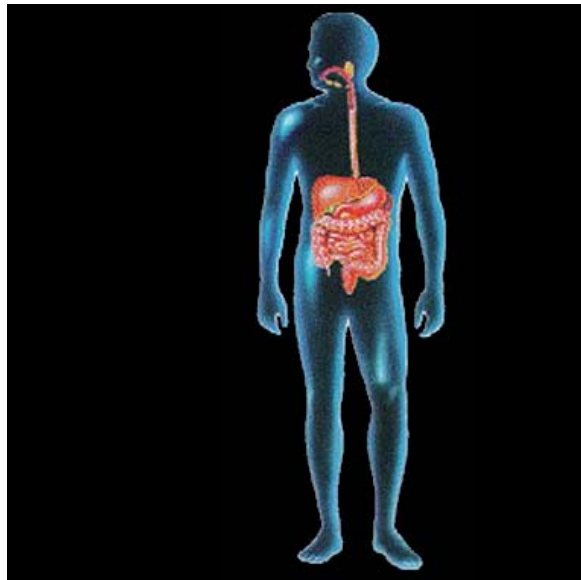
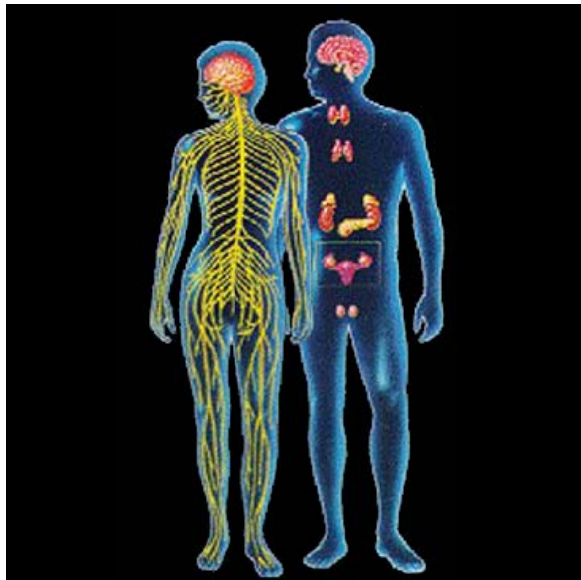
A smart thermostat is similar to a disease management system.



Integration of individual home systems in a larger ecology.



The human body is comprised of systems — working together.

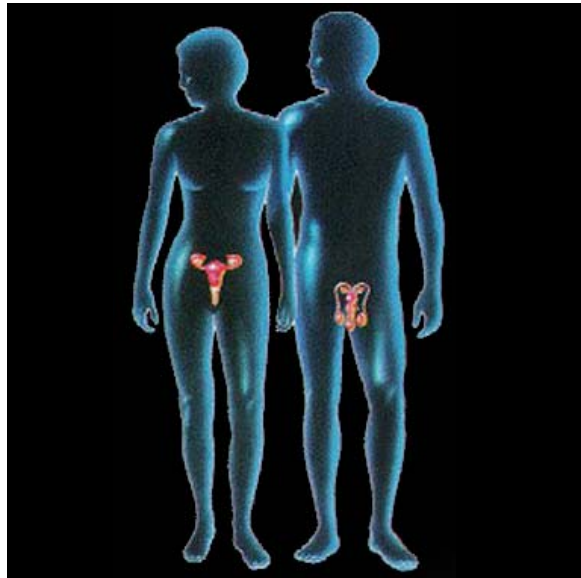
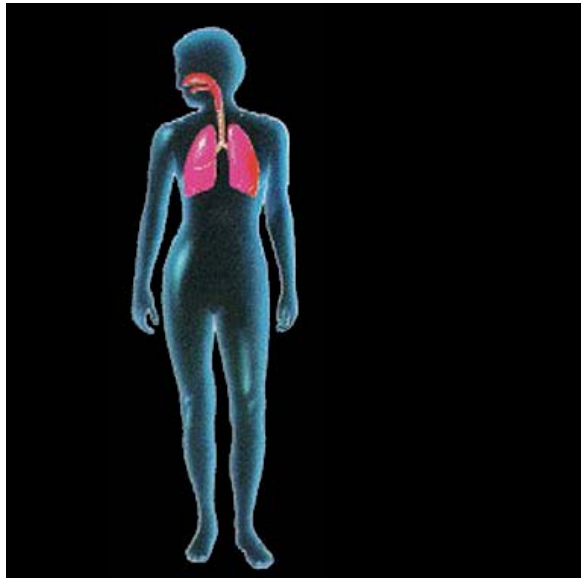
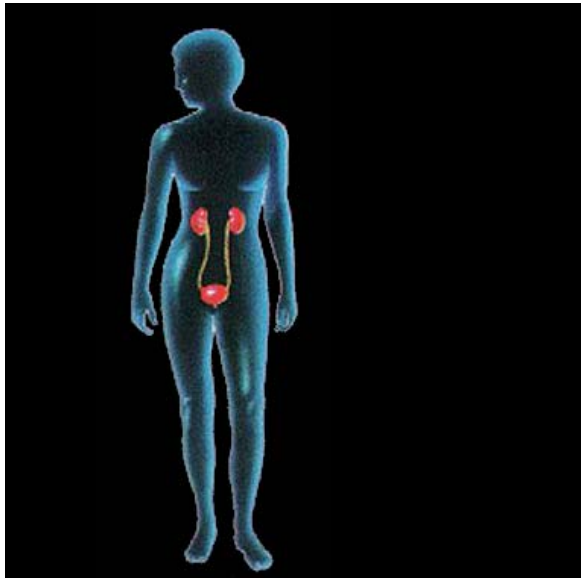


Integumentary system (Skin)

Skeleton + Muscle systems

Nervous + Endocrine systems

Digestive system



Circulatory + Lymphatic systems

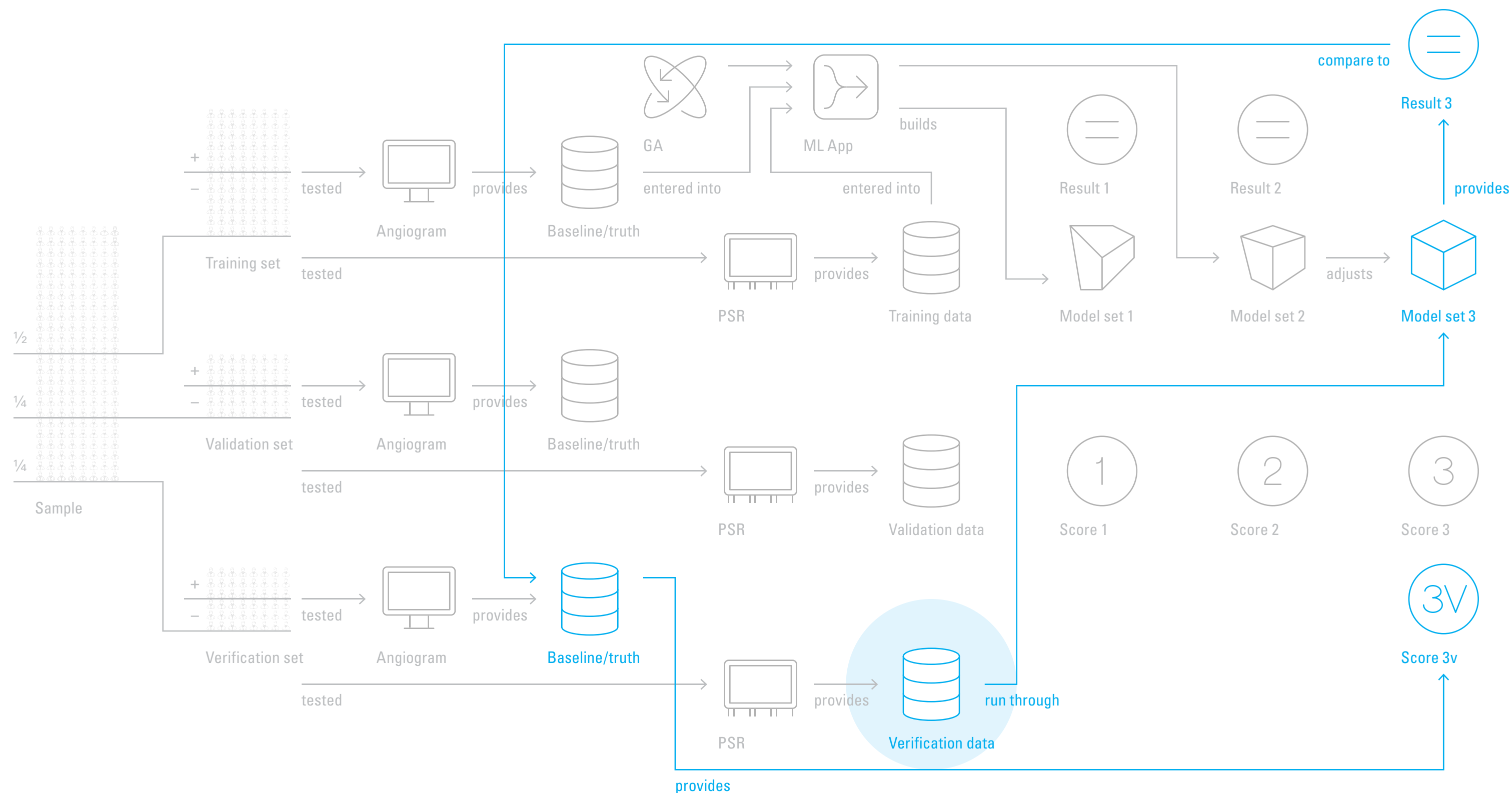
Urinary system

Respiratory system

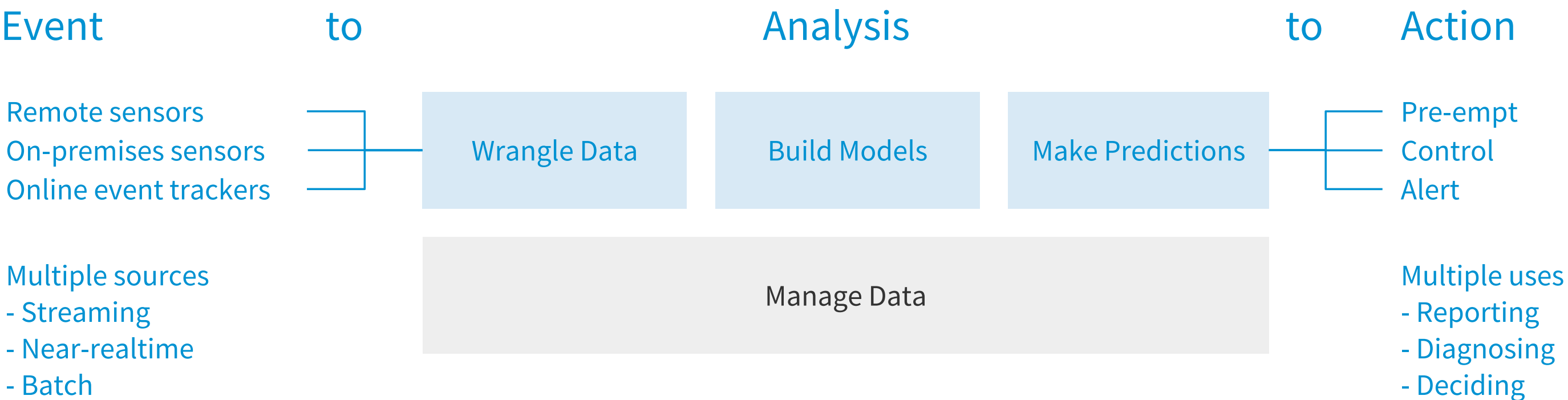
Reproductive system

Not pictured:
Immune system
Metabolic system

Machine learning applied to patient EKGs to detect heart disease.



Building a data refinery for satellite imagery.



What is this new type of design?

Roman architect Vitruvius described three design principles:

durability — convenience — beauty

The International Standards Organization (ISO) mandates software that is

“effective, efficient, and engaging.”

Architect Louis Sullivan proclaimed,
“form ever follows function” —

**while Frog founder and Apple product designer
Hartmut Esslinger quipped,**

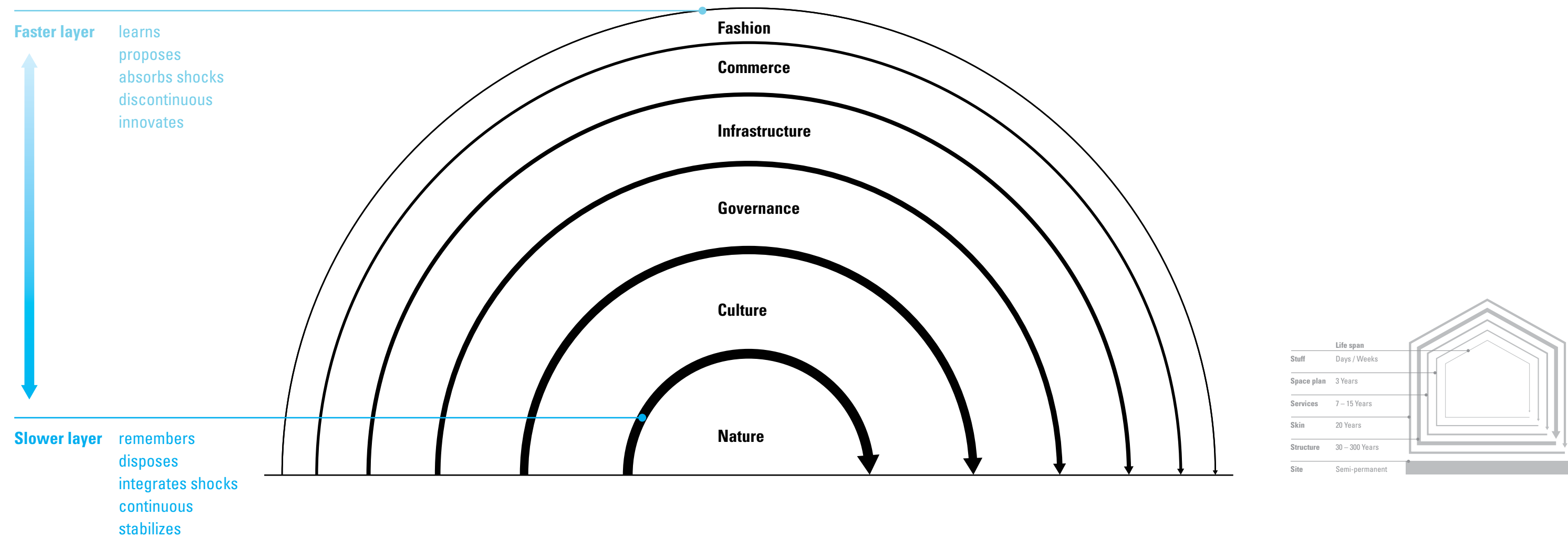
“form follows emotion.”

*“In most people’s vocabularies,
design means veneer. It’s interior decorating.
It’s the fabric of the curtains and the sofa.
But to me, nothing could be further from the
meaning of design. **Design is the fundamental
soul of a man-made creation** that ends up
expressing itself in successive outer layers
of the product or service.”*

—Steve Jobs



Stewart Brand has proposed “a pace layer model.”



Jay Doblin proposed “six types of design.”

Product Performance Design

Uni-systems Performance Design

Multi-system Performance Design

Product Appearance Design

Uni-systems Appearance Design

Multi-system Appearance Design

Tangible objects + messages

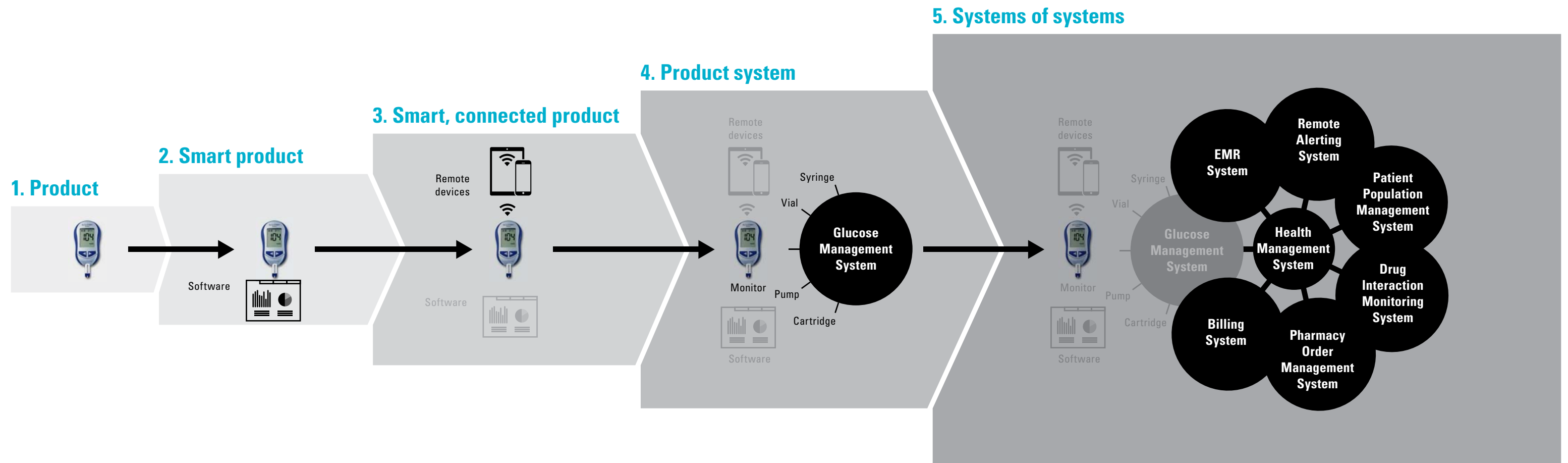
Sets of coordinate products
and people who operate them

Competing uni-systems

Richard Buchanan proposed “four orders of design.”

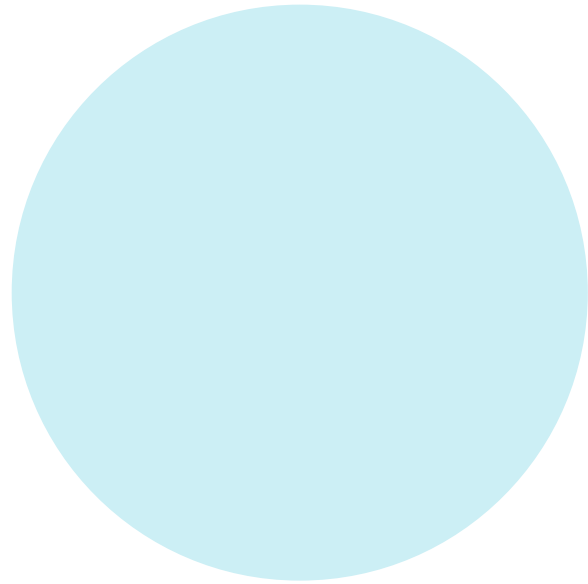
- 1 **Communications** —
a focus on meaning and symbols
- 2 **Artifacts** —
a focus on form and things
- 3 **Interactions** —
a focus on behavior and action
- 4 **Fourth order** —
a focus on “environments and systems in which all other orders exist”

Michael Porter has written about “how smart, connected products are transforming competition” and “redefining industry boundaries.”



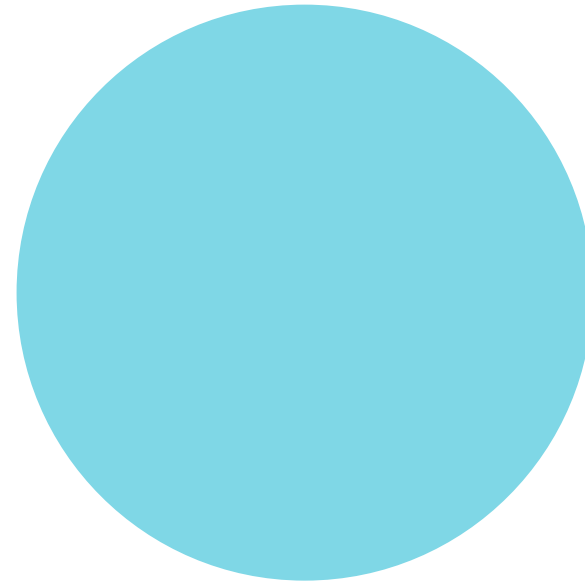
— Michael Porter and James Heppelmann, How Smart, Connected Products Are Transforming Competition
Harvard Business Review, November 2014
<http://hbr.org/2014/11/how-smart-connected-products-are-transforming-competition>

John Maeda has offered a sort of era analysis.



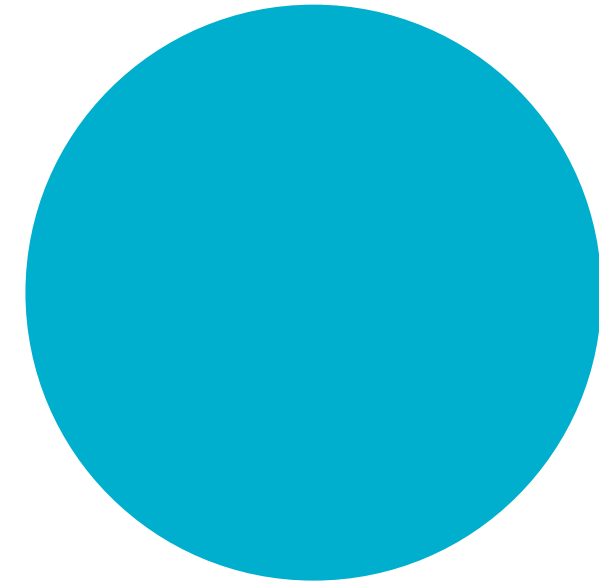
1 Classical Design

There is a right way to make what is perfect, crafted, and complete.



2 Design Thinking

Because execution has outpaced innovation, and experience matters.



3 Computational Design

Design for billions of individual people and in real time, is at scale and TBD.

MIT Media Lab Director, Joi Ito summed it up well...

*“Design has also evolved from the **design of objects** both physical and immaterial, to the **design of systems**, to the **design of complex adaptive systems**.*

This evolution is shifting the role of designers; they are no longer the central planner, but rather participants within the systems they exist in. This is a fundamental shift — one that requires a new set of values.”

—“Design and Science,” January 11, 2016



Each model provides a lens on how design practice is evolving.



“... a building cannot be viewed simply in isolation.

It is only meaningful as a human environment.

*It perpetually interacts with its inhabitants,
on the one hand serving them and on the other hand
controlling their behavior.*

*In other words structures make sense as parts of larger
systems that include human components and the architect
is primarily concerned with these larger systems; they (not
just the bricks and mortar part) are what architects design.”*

— Gordon Pask, *The Architectural Relevance of Cybernetics*, 1967



What is this new type of design?
**Systems that include humans —
designing within systems.**

Designing within systems shifts our thinking...

from

to

Values

Seek simplicity

Embrace complexity

Designer's role

Expert/Deciding

Collaborator/Facilitating

Construction

Direct

Mediated

Stopping condition

Almost perfect

Good enough for now

Result

More deterministic

Less predictable

End state

Completed

Adapting, growing

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Hugh Dubberly
Dubberly Design Office

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