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1

People

1

Homo serviens

We are born with the propensity for services. It is like a genetic predisposition. There isn't a vaccine for it.

In his book *Sapiens: A Brief History of Humankind*, historian Yuval Noah Harari discusses the shift our species made from hunting and gathering to agriculture (Harari, 2015). The shift is thought to have occurred over a period of time, starting around 10000 BC. It led to tremendous growths in the *sapiens* populations, the invention of tools, development of new practices, and the first settlements. It also created new kinds of problems. Humans now had crops to tend and belongings to care for. They became specialized in tasks, getting better at them over time – a trend that continues to this day. However, specialization meant they had to depend on each other for things, and deal with each other like never before. Their lifestyles and diets became more dependent on fewer plants and animals. Living in close quarters gave rise to diseases that previously did not exist. By the time they were seen as problems, the dependency on agriculture was too high. There was no going back.

As a species we are far into a similar shift towards services. *The way our societies have evolved, not a single day goes by without paying for or making use of services.* Benefiting from or being subject to them. Or being a factor in their production. Our lifestyles have changed. We are busier than ever before, doing so many things at once. So many people to interact with and places to be. Many of those we may never visit. Many of them we may never meet. We cannot do it all, by ourselves – we are superspecialized now. So we depend on others more in a single day, than perhaps our ancestors did over an entire lifespan. We are *Homo serviens*. Life is normal with services. Indeed, after any major

Netflix on AWS

By Dave Hora, Research
Manager, PlanGrid

»Amazon Web Services
offers reliable, scalable, and
inexpensive cloud computing
services. Free to join, pay only
for what you use.«

Alexander's pattern language is a set of a 253 distinct patterns that when selected, sequenced, and applied appropriately, will lead to harmonious environments. A generalized insight of the approach is this: given a collection of aligned patterns – a coherent language – this limited set of problem-solutions can help create a near-infinite variety of well-adapted responses to need, based on the context of pattern use, and order in which the patterns are selected and applied. It is through experience of application and sensitivity to results that a collection of patterns can be considered a coherent »pattern language« for a given domain rather than just a set of pattern descriptions.

»Amazon Web Services offers reliable, scalable, and inexpensive cloud computing services. Free to join, pay only for what you use.«

The Amazon Web Services (AWS) is a market leader in cloud computing services.²² The AWS service offerings are an illustrative example of how a coherent set of services, across a number of scales, may come to fit together. By considering every AWS offering a service pattern, developers find new ways to connect, combine, extend, and align these services into higher-order services. The AWS catalog has several lines of service, including computing, storage, databases, networking, content delivery, analytics, security, identity, and machine learning.

Starting in 2008, Netflix, the world-leader in on-demand video, chose to run their growing operations on AWS infrastructure, to be able to dependably produce high-quality outcomes and experiences, for millions of concurrent viewers. No matter who is watching which video from where in the world and at what time, the video should immediately start playing, without delay, and keep playing, without interruption. It is all due to a coherent set of software service patterns working at many levels of scale, with clear interconnected arrangements. It is made possible by hundreds of services together fulfill the promise of a monthly subscription.²³

A brief note on scale. When our own design intent sits with a higher-level outcome than »storing files« or »running a web application«, we consider these kinds of capabilities as service offerings at a »micro« level: meant to be combined to create higher order performances and affordances. In the software-defined world of AWS we find a rich set of service patterns, complementary to

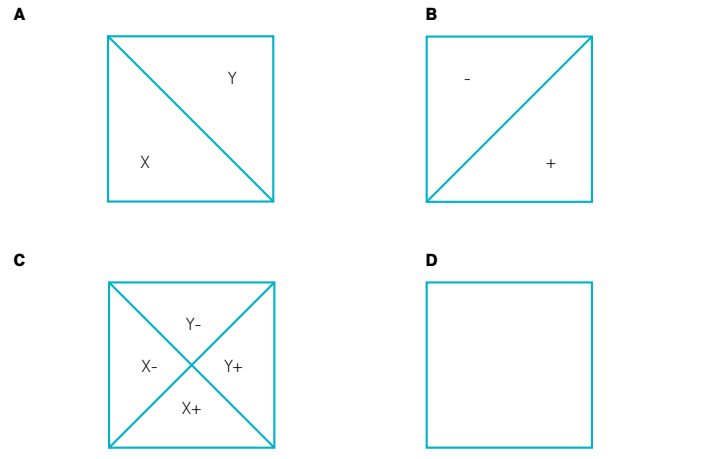


MICRO

The four promises

Services are a set of promises. Four promises, *demand for affordance* [X -], *supply for affordance* [X +], *demand for performance* [Y -], and *supply for performance* [Y +] – corresponding to the four types of things. Two of the promises are from the demand side and two from supply. Two are for performance and two for affordance. The four promises frame the concept of a service. This framing is also known as the *4x frame*.

Figure 16
Gestalt of services



- A Performance and affordance are the two aspects of service. The diagonal separating them is the *line of action* – all action happens along its direction.
- B Demand and supply are the two sides of a service. This diagonal is the *line of interaction* – all dialog and interaction between the two sides happens across this line.
- C Each side covers both aspects. Each aspect includes both sides. Half of each side is for one aspect; the other half for the other aspect. The sides and aspects intersect to define four parts that make a service whole.
- D The service as »a whole that is other than the sum of its parts.« (Kurt Koffka) i.e., the service that emerges from the combination of the four promises has its own properties that do not exist within the parts themselves.

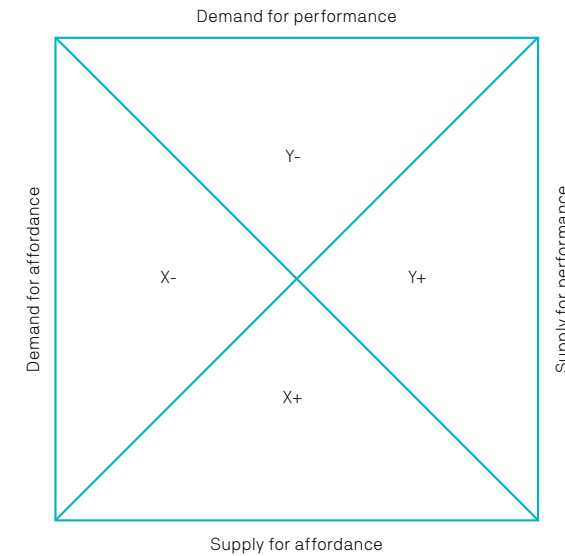


Figure 17
The 4x frame

	[-] Demand for	[+] Supply for
[Y] Performance	Y -	Y +
[X] Affordance	X -	X +

Each promise can be independently conceived, conceptualized, or thought of but you always need two to define performance [Y + and X +], affordance [X + and X -], demand [Y - and X -], and supply [Y + and X +]. Two adjacent promises form a side or an aspect. One side by itself cannot promise either performance or affordance. Commitments are required from both sides.

Customers and service providers make ‘promising’ statements to encourage each other with demand and supply. Propensity matches audacity, and vice versa. When promises are kept by both sides, there is accumulation of goodwill and trust. Both sides are then willing to take more risks, because, as the credibility of claims goes up, the costs go down.

Promising statements

HOW

WHO WHY

WHO WHY

WHAT HOW

WHAT HOW

WHAT HOW



WHO WHY

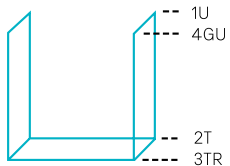
WHO WHY

WHO WHY

Next is the narrative or sequence 1U-2T-3TR-4GU ... in which the user cares about affordance.

- 1U Often, the Ottolenghi fan picks a recipe she likes and then gathers things to prepare the meal.
- 2T Not everything is at hand because she makes meals with fresh ingredients from a local store.
- 3TR Buying only what a recipe needs to have, when needed, is often better for the Planet, purse, and plate.
- 4GU The store layout, signage, and displays make it easy to find what you are looking for and claim it for yourself.

Incorporating the 1U-2T-3TR-4GU narrative gives us:



»Khairun enjoys a lifestyle and diet that keep her healthy, happy, and well within budget. Often, the Ottolenghi fan picks a recipe she likes and then gathers things to prepare the meal. Some recipes call for ingredients that make her *mise en place* set up incomplete. Not everything is at hand because she makes meals with fresh ingredients from a local store. Buying only what a recipe needs to have, when needed, is often better for the Planet, purse, and plate. The store layout, signage, and displays make it easy to find what you are looking for and claim it for yourself. What is not in the kitchen is in the cart, within minutes of deciding what to make. Buying the ingredients and bringing them home is necessary to make the meal. When the items appear on a store receipt, the kitchen at home is soon replete; life goes uninterrupted.«

Note in the last step, the statements 2T and 3TR are repeated – they are exactly the same from both the customer and user perspectives. That’s because, in consumer services the customer and the user are often one and the same person.

Next is 1U-2A-3AC-4UG ... in which the user cares about performance.

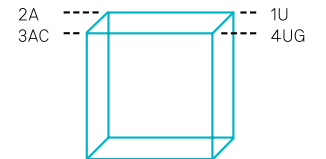
As in the previous step, the statements 2A and 3AC are repeated. The only new statement to add is 4UG. This last statement explains how the ingredients that were in the cart end up both

in a bag and on a receipt. It also completes the demand side of the story.

»Khairun enjoys a lifestyle and diet that keep her healthy, happy, and well within budget. Often, the Ottolenghi fan picks a recipe she likes and then gathers things to prepare the meal. Some recipes call for ingredients that make her *mise en place* set up incomplete. Not everything is at hand because she makes meals with fresh ingredients from a local store. Buying only what a recipe needs to have, when needed, is often better for the Planet, purse, and plate. The store layout, signage, and displays make it easy to find what you are looking for and claim it for yourself. What is not in the kitchen is in the cart, within minutes of deciding what to make. Buying the ingredients and bringing them home is necessary to make the meal. Claiming those items at a store counter allows the cashier to process them for sale. When the items appear on a store receipt, the kitchen at home is soon replete; life goes uninterrupted.«

There are of course two sides to a story. The remaining four narratives tell the supply side of it. They are from the perspectives of the store (the provider) and its staff (the agents), about performance and affordance, concerning the outcomes and experiences. Let’s keep a keen eye on how the two sides of the story join together with the four common statements: 4MV, 4VM, 4UG, and 4GU. Or, how demand meets supply with these four statements, which form the service agreement. Which is why they also correspond to the definitions of the outcomes and experiences. Here we are analyzing a completed 16x frame. In practice, the two sides of the story may be separately written or told, for example, by customers and service providers during a procurement process. Joining the two halves to make it one is then part of a collaborative approach to developing solutions that both sides will equally benefit from.

In this case, the supply side of the story begins with the local store, a retail operation, that assumes the risk of carrying an inventory of perishable goods so customers like Khairun can pursue the lifestyles and diets that make them happy. Like any retail business, location is of paramount importance, so the customer’s hand doesn’t have to stretch too far. It’s about putting goods on a public shelf, keeping the doors open during hours that are convenient, and letting customers grab what they need. Avail-



This makes the 16x frame the ground for achieving consensus between the layers of the enterprise – the stakeholders of the design.⁴⁸ The overall design of the service adapts and evolves over time, getting incrementally better as smaller and more specific changes lead to improvements, without inadvertently adding any new risk of systemic failure.

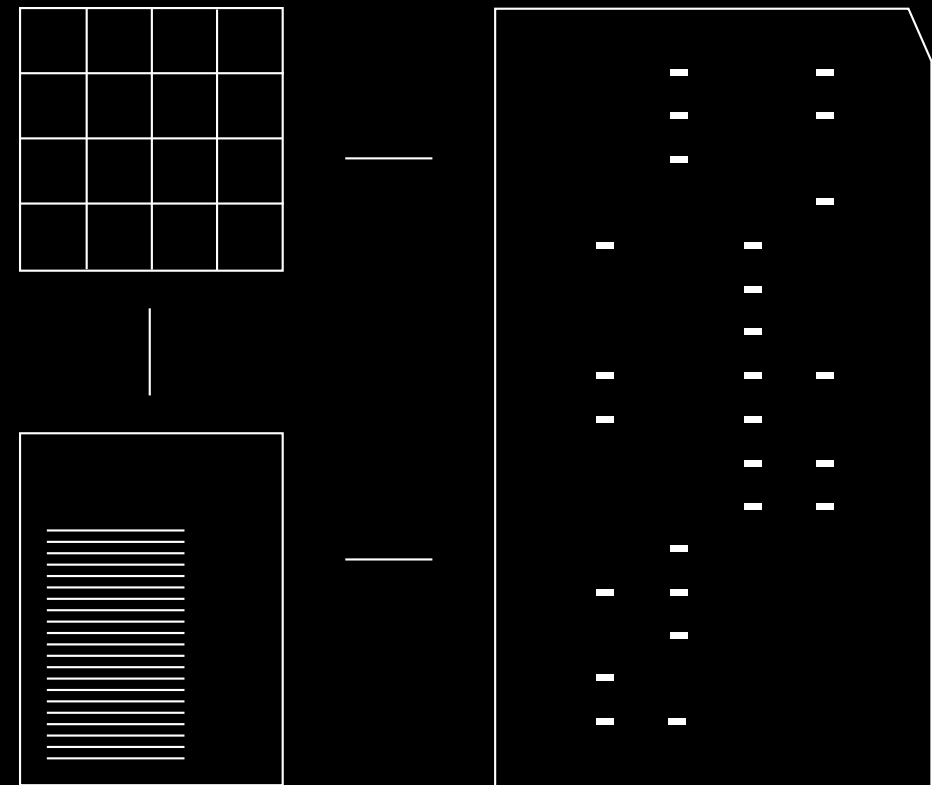
Figure 38
Design as code

	Y+	Y-	X+	X-	
who		■		■	1M
who		■		■	1U
why		■			2A
why				■	2T
who	■		■		1V
why			■		2R
how			■		3RT
how	■		■	■	3TR
who	■		■		1G
what			■	■	4GU
what			■	■	4MV
how		■			3AC
what	■	■			4UG
why		■			2C
how	■				3CA
what	■	■			4MV
	Y+	Y-	X+	X-	

Customer stories

Customers are equal stakeholders in the design of a service. Enterprises procure services for the benefit of hundreds and thousands of users at a time. Such procurement is a notoriously difficult job. The greater the contract value, the greater the possibility for hidden and unexpected costs. To protect themselves from the risks, customers and service providers add terms and conditions that act like uncertainty buffers. In doing so, they un-

FRAME, STORY AND SCRIPT



out the journey. That strategy can result in fuller flights with higher fares.

For that particular flight, the net value equation for the airline could look like this:

$$N = (850 + 50) * 1.00 - (750 + 150) * 1.2 / (8.0 / 7.0)$$

$$N = 1000 - 1080 / 1.14$$

$$N = 55$$

Fare game

The \$ 900 the passenger paid for the ticket can be broken down into an \$ 850 gain and a \$ 50 avoided loss (cost of flying an empty seat) for the airline. And since it is a non-refundable fare with penalties for change, we can assign a probability of 1.0. The airline has to cover its costs and pay all sorts of fees for airport services, baggage handling, maintenance, and repair. Let's say that all of that adds up to \$ 900. We apply a timing factor of 1.2 to account for the fact that those costs are not only incurred a long time in advance, sometimes months ahead, but have to be paid even if the aircraft flies half-empty (load factor). Airlines go to great lengths not just to make things easy for passengers, but also for themselves. Which is why they enforce certain rules. The effort passengers put in makes things easier for the airlines. Assuming ease = 8.0, and effort = 7.0, the quality of experience of the airline agents = 1.14. The number varies across passengers and across the classes of fare.

The airline puts in a lot more effort toward passengers traveling in business class and first class cabins, but that is more than compensated for by the premiums those passengers pay. The airline has to make additional arrangements that cater especially for those passengers, who are then also allowed to make last-minute changes that could lead to empty seats. But other operating costs remain largely the same and are spread across all the classes of travel. We tweak the numbers just to illustrate the difference:

$$N = 3000 * 0.95 - 1500 * 1.25 / (7.0 / 10.0)$$

$$N = 2850 - 1080 / 0.7$$

$$N = 171$$

Even though it is costlier to serve the premium fares, the airlines earn much higher net values from them. In many cases, the net

value from a single first-class seat can make the difference between a flight being profitable or not. What about low-fare airlines then?

Low-fare airlines operate out of less expensive airports, thus transferring some of the costs to passengers, many of whom have to travel further to the airport. The facilities they provide are leaner, and the procedures they require passengers to follow are longer. They purchase time slots that are cheaper for them but tend to be during off-peak hours. They operate out of terminals and gates for which airports charge less of a premium. Some of them do not provide the convenience of a jet way, requiring passengers to ride a bus and climb stairs. Most importantly, they unbundle the legacy airline package. Passengers pay separately for seats, bags, meals, and in-flight entertainment. Therefore, only the air fare is low. For a low-fare airline we can illustrate the difference with the following numbers:

$$N = 350 * 1.0 - 500 * 1.1 / (10.0 / 6.0)$$

[Passenger fare: \$ 275, seat: \$ 25, bags: \$ 50]

$$N = 350 - 550 / 1.7$$

$$N = 20$$

If the total cost of flying a passenger is \$ 550 then how does applying the E factor magically make the costs disappear? \$ 550 is the cost the airline would incur if it actually carries out all the effort that it passes on to passengers, who willingly accept the additional burdens in return for the low prices, including paying for travel to secondary airports at far off locations. Take a trip to make a trip. *Outcomes are what they pay for. Experience is what they pay with.*

Take for example, an airline experiencing technical difficulties that are not attributable to weather or any such event outside their control. As a consequence, the flight arrives at the destination two hours late. The check-in and boarding experiences for all the passengers are otherwise great, and the bags arrive on time at the carousels. The airline of course apologizes for the delay, but if passengers and bags have safely reached their destinations, has the service really failed? And if so, in what way?

The low-fare airline

When a flight is delayed

O - P // E = N N = O - P // E

10

Closing

10

The Sunshine Cab Company

The Sunshine Cab Company is a service company owned by the vehicles. Each autonomous vehicle is a legal person recognized by law – i.e., they can acquire property, conclude contracts, and be sued for damage. Machines own and operate Sunshine, filling the roles of service provider and agent (MM). Their customers and users are humans (HH). They have the reputation of being the quickest, safest, and most dependable taxi service. They're especially known for their patience, politeness, and safe driving. With their HHMM model, they effectively compete with services that have humans on both sides (HHHH).

Sunshine has signed a series of contracts with service providers that support its operations. One company finds riders, provides dispatch, optimizes routing, adjusts pricing, and handles payments. Another provides maintenance, repair, and overhaul and garages for parking. And yet another provides machine learning experience – so the driving gets better over time, attracting customers, reducing operational risks, and earning discounts on insurance premiums.

Sunshine also retains the services of a white-shoe law firm to represent them in all matters and protect their interests, including negotiating contracts and defending them in court. An accounting firm helps with all financial matters, including taxes. A security firm monitors and protects them from all kinds of threats, including vandalism and hacking. As taxpayers they also benefit from regular law enforcement.

Double Helix is a design studio and consultancy that offers »Designcoding«. They specialize in HHMM contracts. For their clients they develop hundreds of 16x frames that cover the