

Individual Fitting for Virtual Footwear Retailing: Building a link from 3D CAD to Industrial Made to Measure

Andrey Golub. CEO & CTO



ELSE Corp, a Virtual Retail Company

- **B2B and B2B2C solutions**
- **For brands, retailers and manufacturers**
- **Cloud SaaS platform**
- **Front-end retail processes** (product personalization and 3D commerce)
- **Cloud-based back-end processes** (mass customization, virtual fitting and order generation for smart hybrid manufacturing)
- **Catering to Segment of One**



A B2B and B2B2C Platform & Service Provider
www.else-corp.com

Ready to Wear System of Today: One Size/Style fits ALL



Overproduction



Human & Environmental Impact



Transportation Expenses



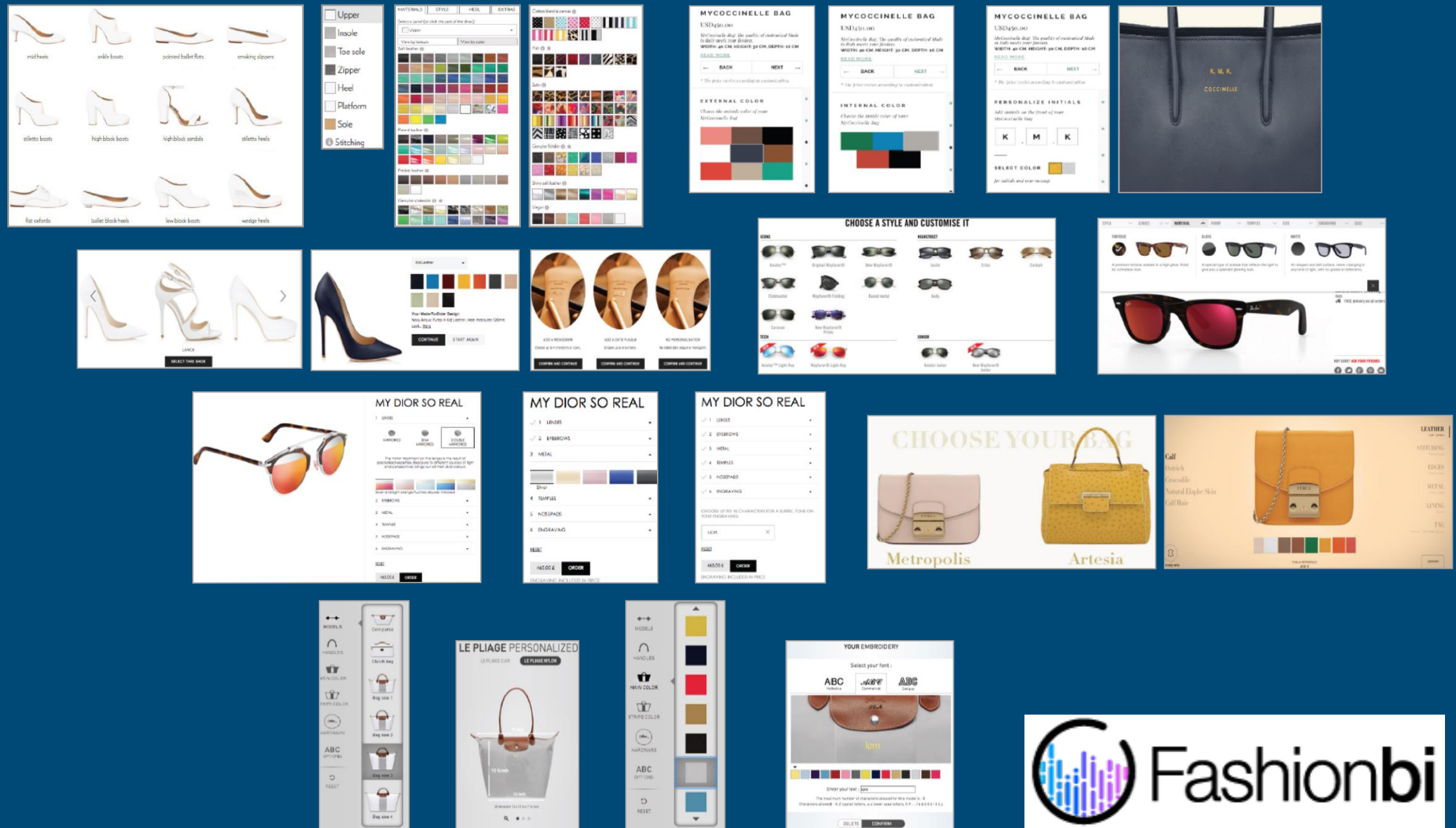
Unreal Standards



Overstock

Customization, Personalization, Direct to Consumer: the new market scenarios

- Customization and personalization are on the rise
- Due to sociological changes a larger part of production and sales in the fashion industry
- Consumers want made to measure, made to order and personalised products and customisation allows that
- This practice has led to mass customization by brands in order to tap this increasing market segment



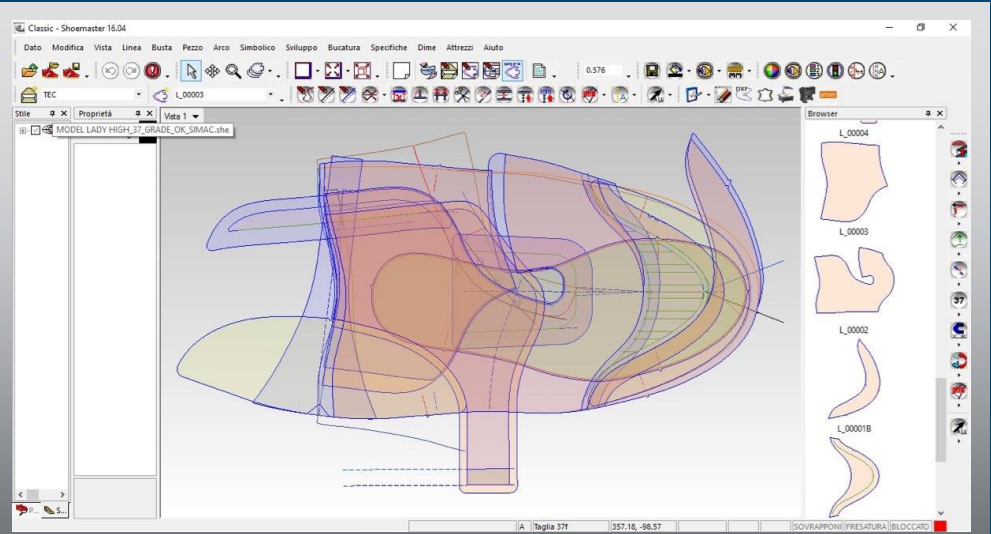
Virtual Retail

- 
- Strategy for Digital Transformation of entire value chain
 - Brands, Retailers, Manufacturers
 - Direct to Consumer approach
 - Industrial process for 3D & Cloud based Mass Customization
 - Leverages 3D technologies, Industry 4.0, AI
 - Transforms brand distribution channels into new concept spaces
 - Virtual Shopping CX through different channels

3 Key Elements



An End to End solution for Footwear 4.0



3D CAD



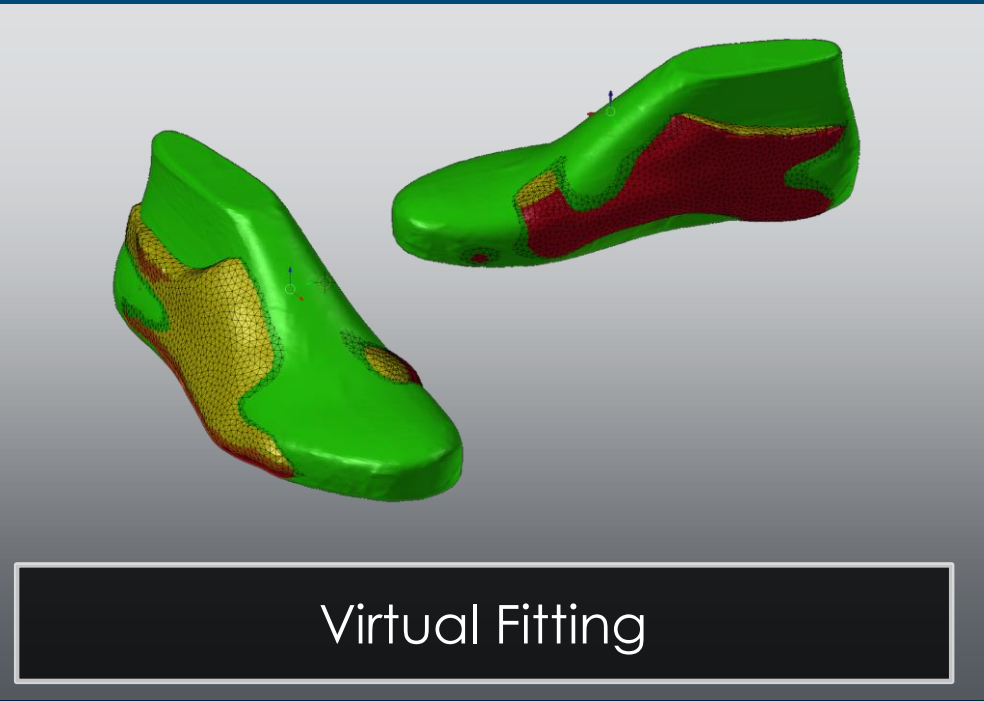
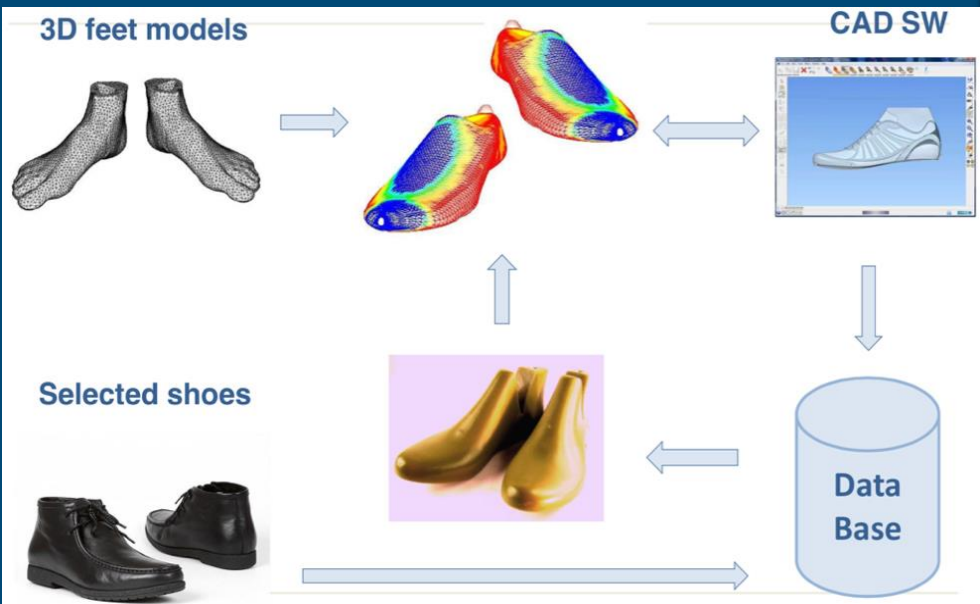
3D Foot Scanning



3D Model of Foot



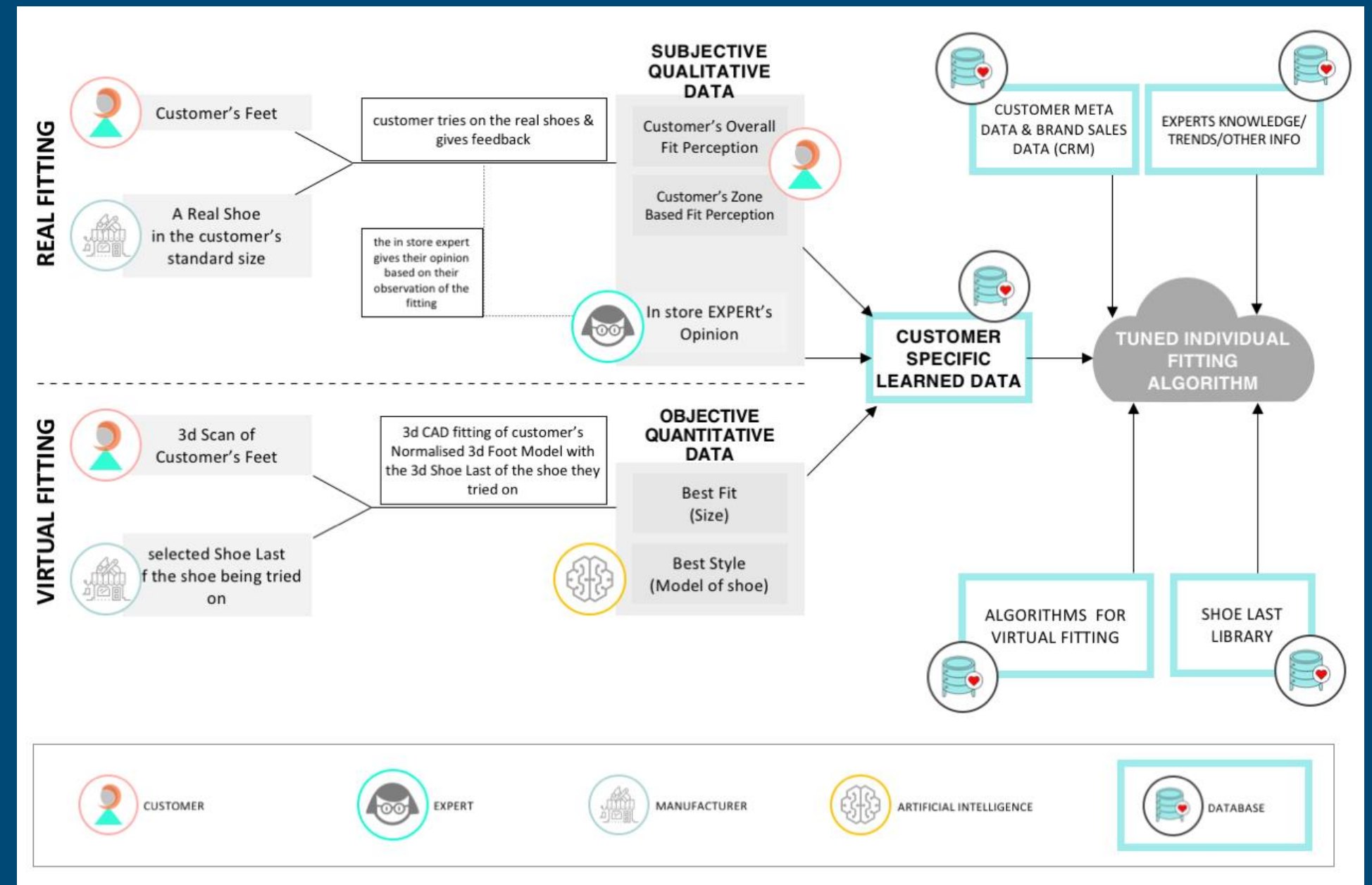
Virtual Retail Corner



Virtual Fitting

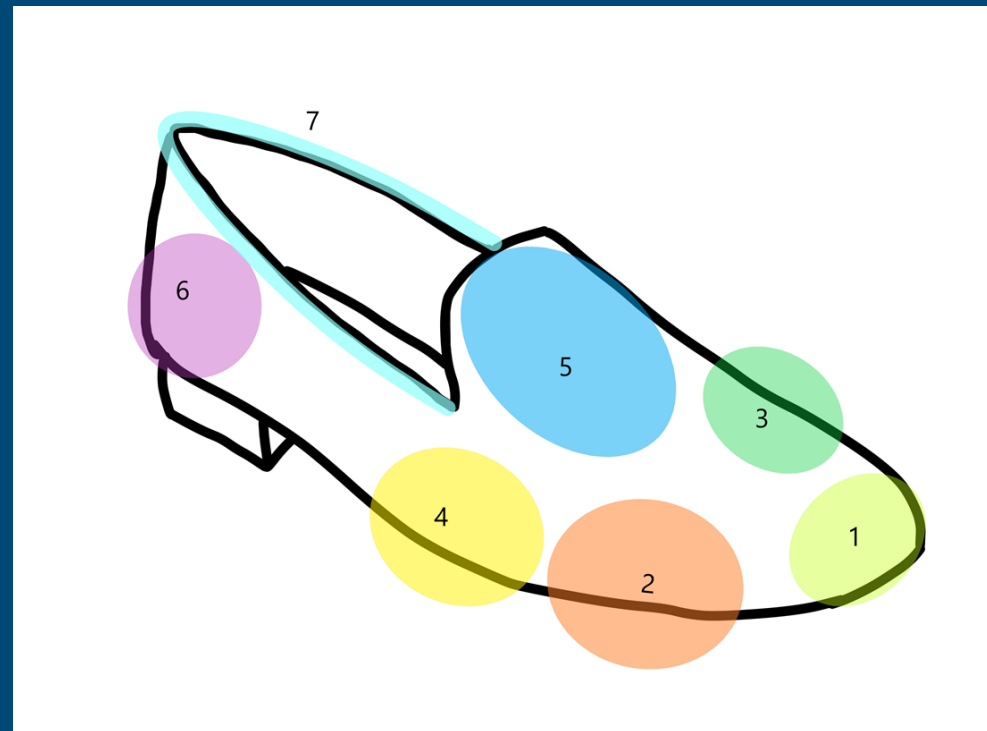
Individual Fitting for Footwear Retail

- new approach for Virtual Fitting and Virtual Try On of shoe
- combines known Virtual Fitting methods with Real Fitting/Try-On with feed-back incorporated
- results in a unique algorithm generated for each customer
- more trials = more precise algorithm
- currently in experimental development with brands and manufacturers
- to identify the ideal shoelast for each customer, it mixes industrial knowledge about:
 - footwear process
 - CAD Design data
 - machine learning
 - human interaction

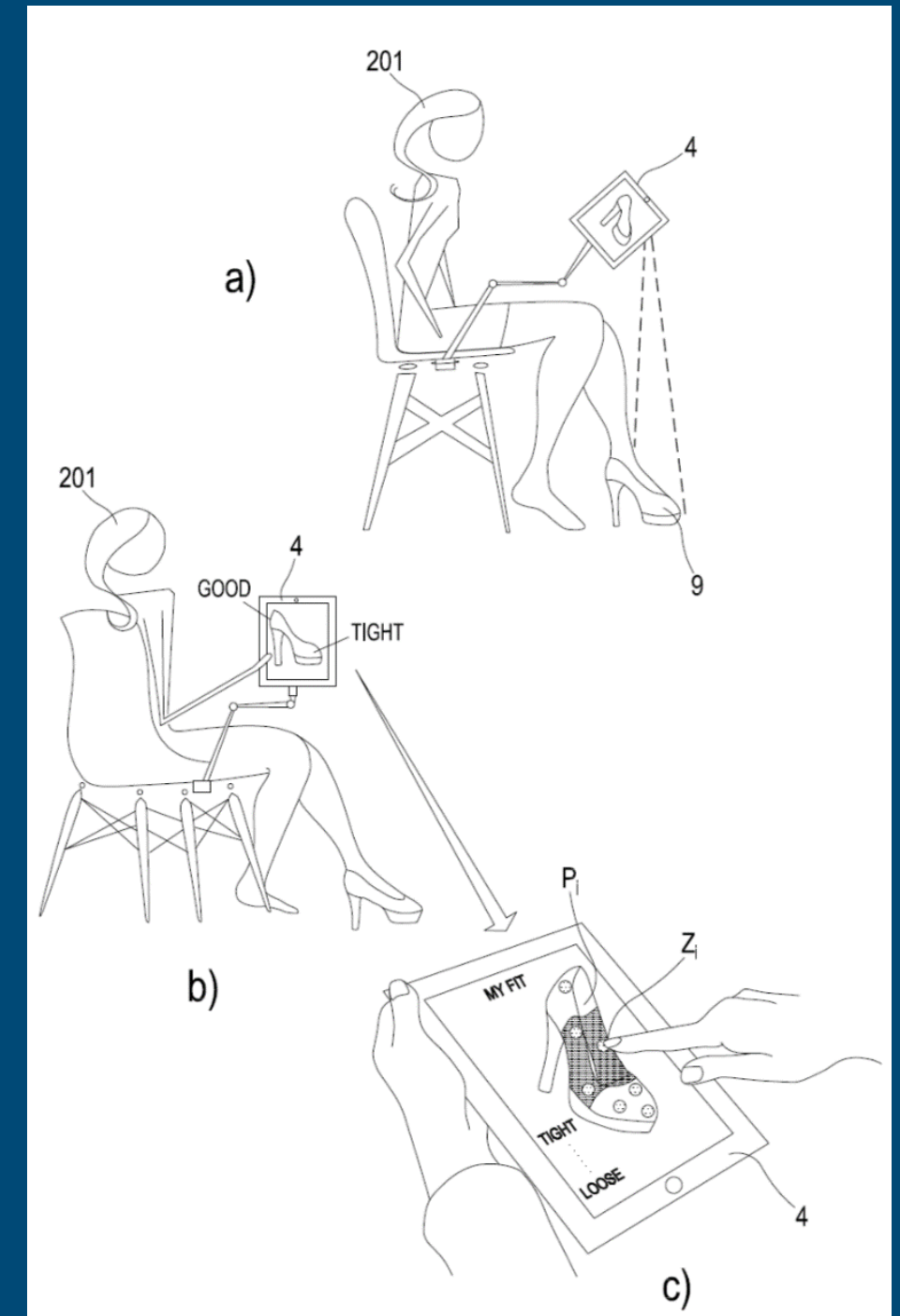


Next steps: Real Fitting and Feedback gathering

- Level Two and Three fitting approaches incorporate both the Virtual Fitting and the Real Fitting
- Includes customer feedback during real physical fittings
- A layer of data science considers general and comfort zone-based feedback of customers from physical fittings
- Feedback is recorded by a store assistant (expert) and supported by an application on a tablet
- The customer indicates their General and Zone-based feedback



Comfort Zones for zone-based feedback



Feedback Gathering on tablet during Real Fitting

Brand's Shoelasts



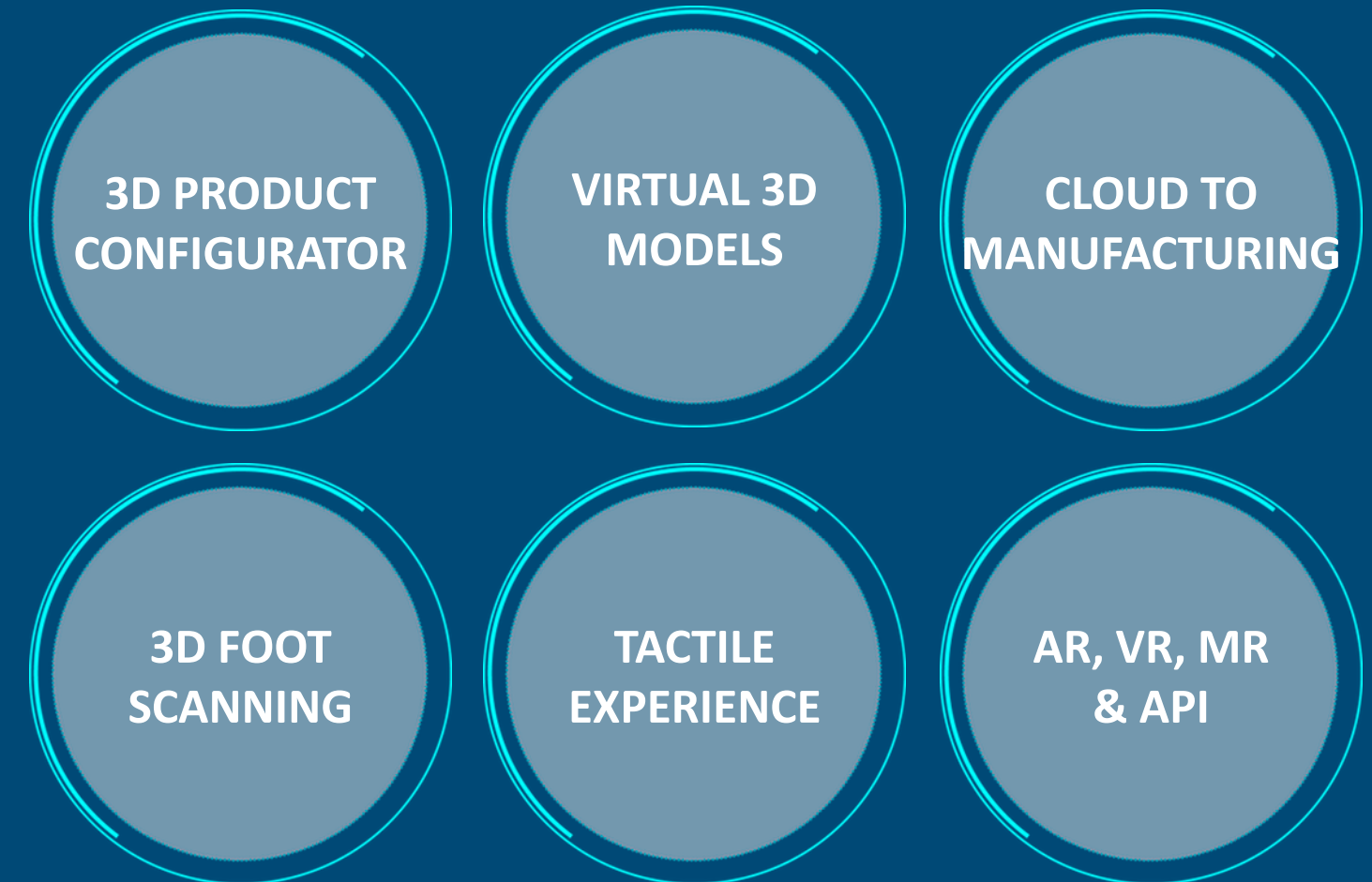
Each shoelast is classified and registered (as meta data only) in a database of shoelasts with the following information stored about it:

- Metrics: measurements and dimensions
- Related models, based on these shoe lasts
- “Similar” shoelasts from different models or collections
- Product Part identification, coming from CAD 3D and shoe modelling (based on an x,y,z axis)
- Feet zone identification for feed-back registration and generation of industrial MTM extension of shoe last (based on an x,y,z axis)
- Recommended feet types
- Any other meta data, to be taken into account by Machine Learning

Else.shoes™ Virtual Retail Platform

- End-to-end industry solution for the footwear sector
- Based on the E.L.S.E. and ELSE-ware frameworks
- Enabling mass customisation, industrial made to measure and on demand production
- 3 Modules
 1. MySize (Virtual Fitting)
 2. MyStyle (Product Customization)
 3. DIY&AI (AI based recommendations)

6 Key Elements



3 Modules



Virtual Shopping Experience through the Virtual Retail Corner

In a physical space, at a Virtual Retail Corner, the flow of the experience would be as follows:

1. Register/Login
2. Scan Feet
3. Select a product
4. Customize the product
5. Virtual Fitting
6. Try On registration



Virtual Boutique 3D app

Virtual Catalogue 3D app

Cloud based 3D Configurator

Sales Assistant's tablet app

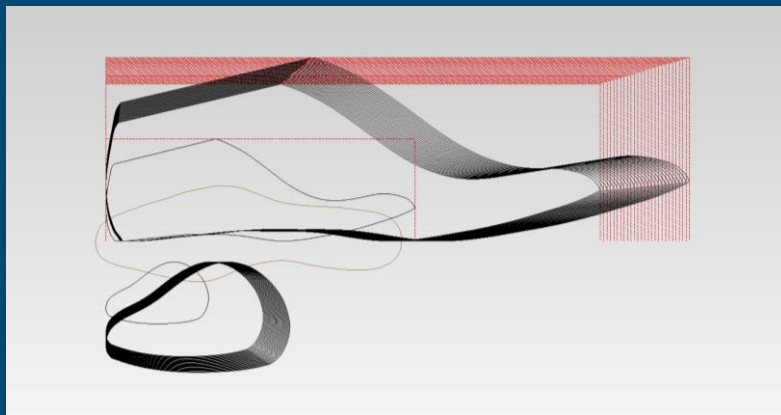
Physical Samples and test products

3D foot/ body scanner and its tablet app

Customer Fit Solutions: a Four Level Approach

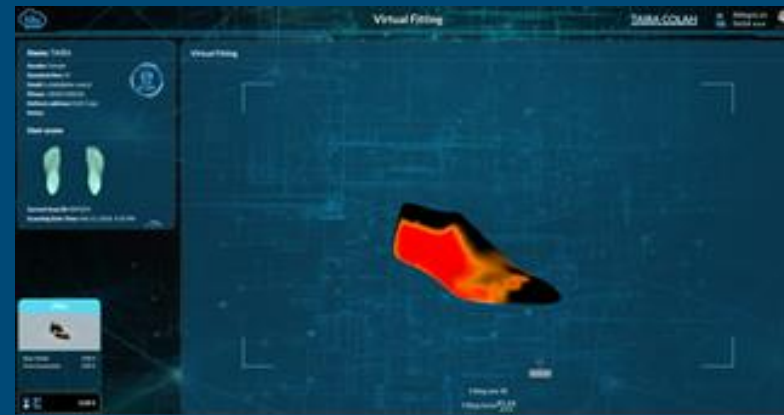
0 SIZING

- Each brand's shoelasts are designed with certain size grading and shape
- Each customer must determine if the footwear fabricated from these lasts will fit them or not



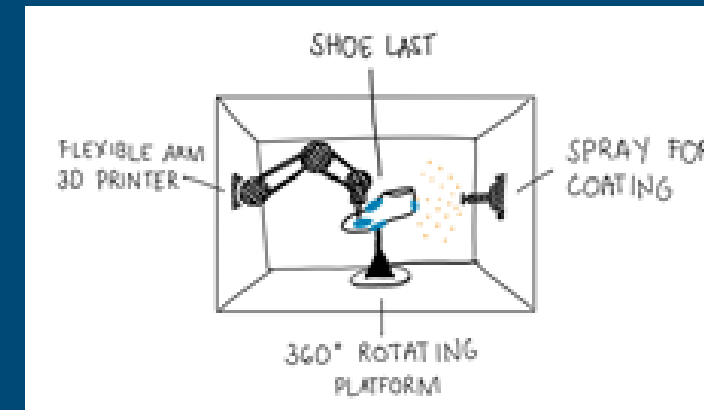
1 BEST-FIT

- Most basic
- Identifies a shoelast with at least 85% Fitting Factor
- Considers Shoelast data + Individual Customer's data
- Currently implemented in the Virtual Fitting module



2 INDUSTRIAL MADE TO MEASURE

- Shoelast is modified with individual 3D printed patches
- Temporarily applied
- Only pre-defined MTM Zones are modifiable



3 TOTALLY CUSTOM /BESPOKE SHOELAST

- True custom/bespoke shoelast is created for the customer
- Designed in CAD or through semi-automated procedure
- 3D Printed or Traditionally made



Current Progress on Virtual Fitting

- Best Fit approach
- Based mainly on mathematical conclusions
- In the case of purchasing a standard-size product, it identifies the best standard-fit
- In the case of a made to measure product, it identifies the closest shoelast for adjustment



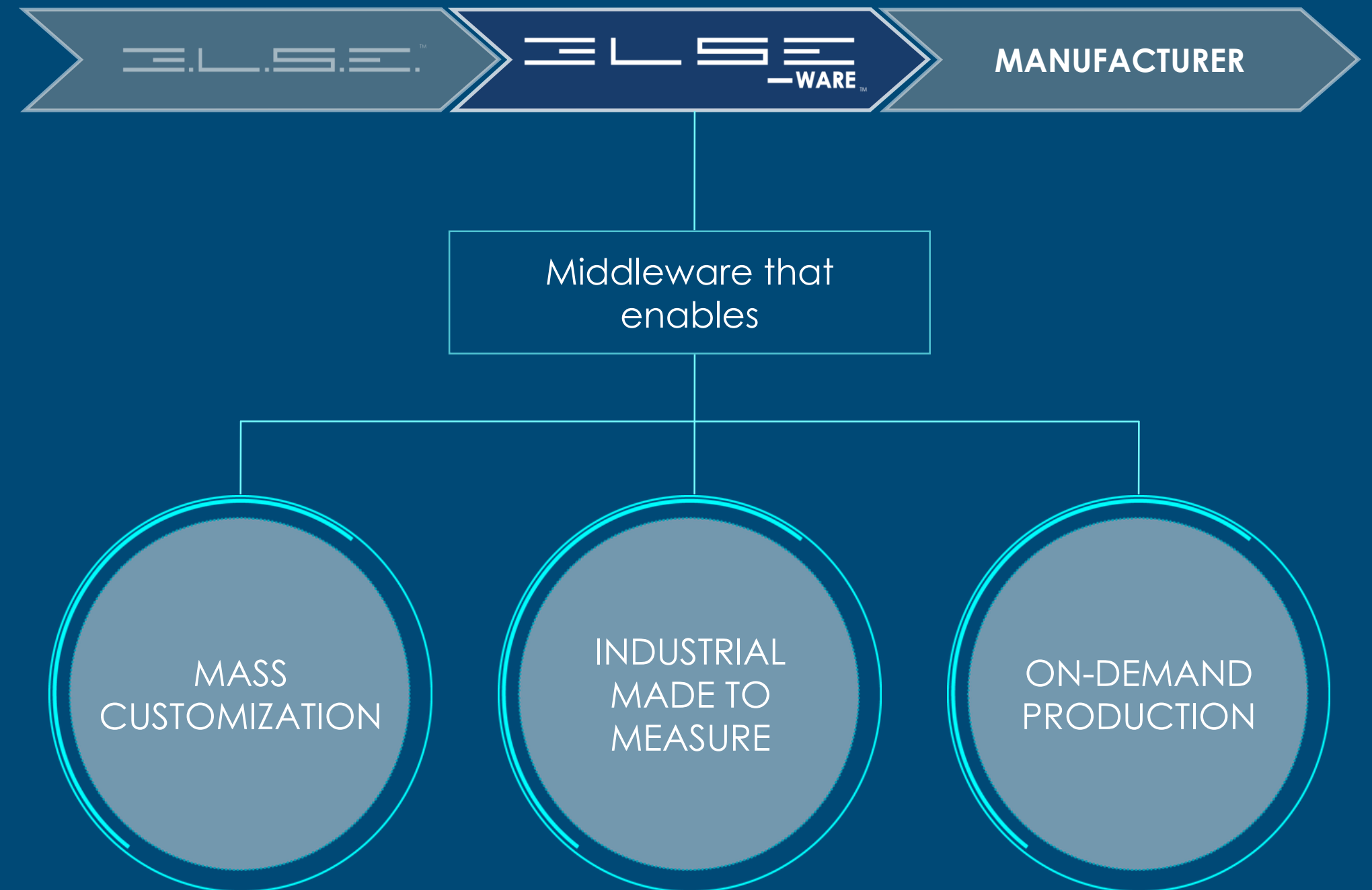
Implementation Of Virtual Fitting For Manufacturing 4.0

- Joint project between ELSE Corp; ATOMLab; and Shoemaster®
- Store and factory of the future
- Ultra-rapid manufacturing of “assembled to order” shoes, in four steps:
 1. SCANNING to gather the measurements of the customer
 2. VIRTUAL FITTING to identify the Best-fit size and style
 3. CUSTOMIZATION to configure and select the parts of the shoes
 4. ORDER GENERATION & ASSEMBLY to send the order to the factory where customers assemble the shoe



ELSE-ware middleware

- Hybrid & distributed manufacturing 4.0 middleware for apparel and footwear
- Built on top of E.L.S.E.
- Ready and open for integration or extension
- Enables mass customization, industrial made-to-measure and on-demand production
- Once a product is customized an ERP grade Customized Hybrid Manufacturing Order (CHMO) is generated and sent via ELSE-ware to the manufacturer who produces the custom product just-in-time

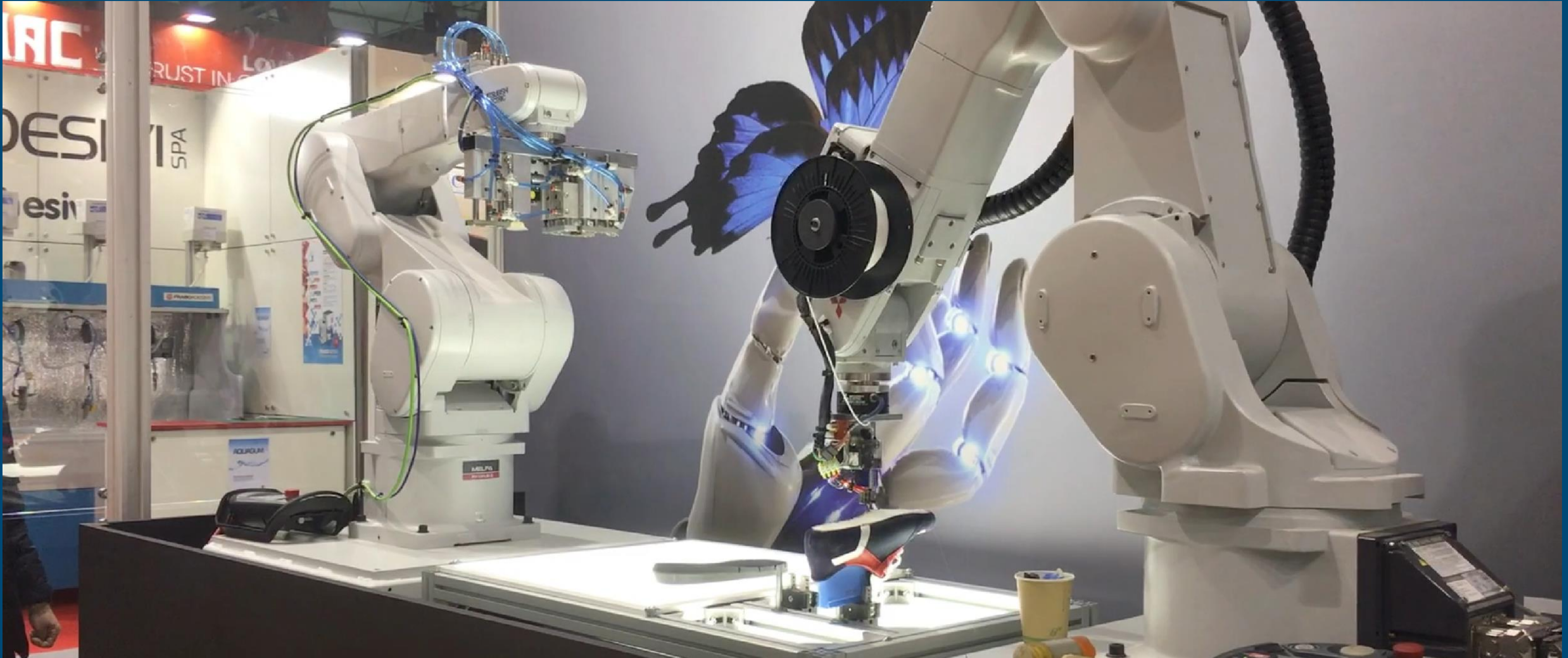


Customized Hybrid Manufacturing Order

- Generated-in-real-time
- Fully compatible with any manufacturing OS or ERP system for both, traditional and digital manufacturing
- Sent automatically via ELSE Corp's cloud based manufacturing 4.0 middleware (ELSE-ware)

```
untitled
1 <?xml version="1.0" encoding="UTF-8" ?>
2   <order />
3   <customer />
4   <totals />
5   <payment />
6   <shipping />
7   <store />
8   <billing />
9   <products>
10    <product>
11      <weight>0.5</weight>
12      <sku>S16S-Gec-RS</sku>
13      <productId>546</productId>
14      <productType>shoe</productType>
15      <originalPrice>0</originalPrice>
16      <name>Summer 2016, Gecko Shoe, Small, Red</name>
17      <itemId>0</itemId>
18      <updatedAt>1/28/2016 9:01:26 PM</updatedAt>
19      <createdAt>1/28/2016 9:01:26 PM</createdAt>
20      <description>Some description</description>
21    </product>
22    <payment />
23    <mtm>
24      <shoe_last>
25        <size>38</size>
26        <URI>https://elsedamstorage.blob.core.windows.net/dam/shoe_last/f4bc5835-4d45-40d3-aed9-2420f8fa2ba1/last.stl</URI>
27      </shoe_last>
28      <avatar>
29        <right>
30          <URI>https://elsedamstorage.blob.core.windows.net/dam/avatar/b91f0eba-7827-42c7-94ca-3d13cb9411aa/right.stl</URI>
```


RoboShoe 2018 Video



<https://vimeo.com/257202270>

Thanks

www.else-corp.com

a.golub@else-corp.it

