

BCN TIG Capability Overview & Case Examples

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DRAFT

BAIN & COMPANY 

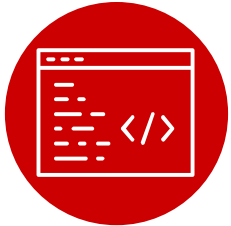


PE investment in tech companies require a comprehensive view on product offerings, code quality and talent to determine full potential



Measure economic benefits

Assess **product offerings, differentiation** and **future roadmap viability** of software platform



Forecast associated risks

Evaluate usage of open source coding and 3rd party software to identify potential **license concerns and vulnerabilities**



Leverage talent capabilities

Determine company's R&D organization structure to execute modernization roadmap and **remediate deficiencies in talent**

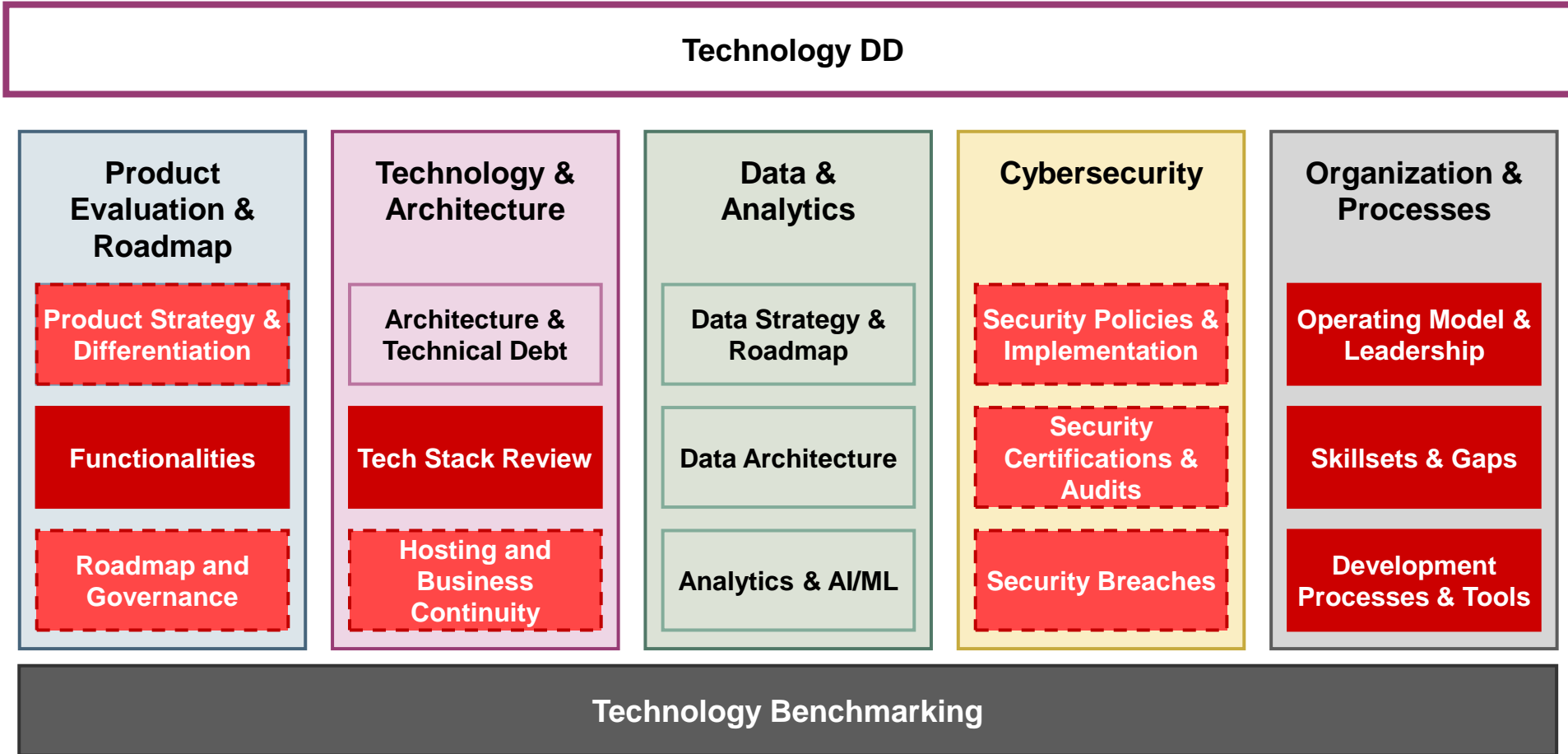
- **Gain deep understanding** of target's platform, architecture, cybersecurity, development processes and engineering talent **for better decision making**
- **Uncover potential risk** pertaining to product, technical condition, tech stack and organizational processes before M&A or capital investment

Technology DD helps in attaining a detailed perspective on software assets from its functionality and infrastructure to its security and processes

TECHNOLOGY DUE DILIGENCE

KEY AREAS

Pre-deal



Pre- and post-deal

VCP and Cost Implications

Value Creation

Tailored value creation workstream, which may include modules such as product strategy development and software development effectiveness, etc.

Core Offering

Ad-hoc Offering

BCN capabilities enhance all key pillars typically included in a TechDD

BCN CAPABILITIES

✓ Significant capabilities to advance the answer

⚡ Moderate capabilities to advance the answer

Diligence type	Product & roadmap	Tech & architecture	Op model & R&D excellence	Cybersecurity	Investment (CapEx / OpEx)	Other case management
Without access	<p>✓</p> <ul style="list-style-type: none"> Product strategy & differentiation (2 days) <ul style="list-style-type: none"> Company overview & evolution timeline Functionalities and UI/UX, compatibility, use cases Company / product reviews, trust radius etc.) <p>← Competitor benchmarking →</p>	<p>✓</p> <ul style="list-style-type: none"> Tech used (2 days) <ul style="list-style-type: none"> Tech stack mapping API analysis 	<p>✓</p> <ul style="list-style-type: none"> Organizational overview (2 days) <ul style="list-style-type: none"> Bottom-up analysis (LinkedIn and Aura) - role, tenure, geo, hiring/attrition trend Employee sentiment analysis (Glassdoor, Indeed etc) 	<p>⚡</p> <ul style="list-style-type: none"> Security breaches (1 day) 	<p>⊗</p>	<p>✓</p> <ul style="list-style-type: none"> Survey analytics – coding/testing, analytics/cutter and slide output Sector scans and target screening – building customized target list for potential acquisitions; assessing deal activity and its trends
With access	<p>✓</p> <ul style="list-style-type: none"> Product capabilities & functionalities (1 day) Roadmap timeline, product governance (1 day) <p>← Competitor benchmarking →</p>	<p>⚡</p> <ul style="list-style-type: none"> Code scan analysis (2 days) <ul style="list-style-type: none"> Open source, LOC analysis Hosting & business continuity 	<p>✓</p> <ul style="list-style-type: none"> Organizational overview (2 days) <ul style="list-style-type: none"> Census analysis Organization structure & leadership efficiency Development processes (1-2 day) <ul style="list-style-type: none"> SDLC process defect analysis 	<p>⚡</p> <ul style="list-style-type: none"> Red flag report - Security policies, certifications & audits (1 day) 	<p>✓</p> <ul style="list-style-type: none"> Hosting cost and R&D spend analysis (1-2 day) 	<ul style="list-style-type: none"> Digital diagnostic – assess scale / engagement and optimization levers ESG diagnostic – 1-day answers leveraging ESG Rave and lit search

Note: The number of days under consideration is based on standard analysis and is subject to change depending on individual cases

The BCN can offer 3 SKUs covering a broad range of outside-in analysis as well as analysis with company data

SOFTWARE ASSESSMENT

BCN OFFERING

	SKU 1: R&D Snapshot	SKU 2: Product Synopsis	SKU 3a: Lite	SKU 3b: Deep Dive	Primary Research
	Outside-in assessment		Company Data assessment		Bolt-On
	~2 Days Analysis	~5 Days Analysis	~2 Days Analysis	~5+ Days Analysis (including Lite)	~3-5 Days Engagement
Scope	<ul style="list-style-type: none"> Tech Stack Mapping: evaluation of languages and supporting frameworks Organizational Overview: assessing current state of R&D organization for right experience, skill level and size 	<ul style="list-style-type: none"> Product Functional Scan: product market overview, functionality benchmarking (Target vs competitors), UI/UX analysis, product reviews Tech Stack Review: evaluation of languages and supporting frameworks Organizational Analysis: assessing current state of R&D organization – growth, attrition, tenure, geographical presence, employee sentiment analysis 	<ul style="list-style-type: none"> Organizational Analysis: analyzing R&D census data for growth, attrition, tenure, geographical presence, compensation along with employee sentiment analysis Development Processes & Tools: assessing the SDLC process design and implementation 	<ul style="list-style-type: none"> Product Evaluation & Roadmap: roadmap initiatives and alignment with market needs Product Functional Scan: product positioning based on functionalities, UI/UX and reviews Tech Stack Evaluation: evaluation of languages and frameworks along with risk assessment of 3rd party and open-source code 	<ul style="list-style-type: none"> Active sourcing of experts/ customers for interview via networks/ LinkedIn/ warm leads Generate long list of experts/ customers to be interviewed Scheduling/ conducting calls by direct third-party vendors/networks Detailed notes in standardized word/ excel template summarizing insights based on calls conducted
Timeline and fees*	<ul style="list-style-type: none"> 4.5 FTE @ \$3.1K per day (depending upon scope / SKUs) 2.5 FTE @ \$1.8K per day (depending upon scope / SKUs) 				~\$2K-3.3K per day (depending on scope)
Key Tools/ Sources					

Note: *Fees doesn't include cost associated with sources; Aura fees is \$9.5K tool charge (including BCN day 1 cost)

Key BDPs to collaborate with BCN

Staffing / pre kick-off

- **Single POC** to coordinate staffing/ pipeline management with BCN lead
- **Plan 1-2 days in advance**
 - BCN team may not be available on immediate request
 - Buffer for any pre-planning on data for digital tools
- **Identify key questions** which BCN's **core productized analytics** can help answer
 - As far as possible, align with pre-kick off on potential work streams

Kick-off

- **Provide case context** and key hypothesis to be tested via BCN work-stream
- **Align on BCN work-streams**
 - Align up-front on broader plan
 - Focus on 1 work-stream at a time/ BCN team works as single unit
 - Check for BCN input on feasibility/ alternatives for gaps
- **Assign PoC** for ongoing engagement
 - Consultant+ typically best positioned to work with BCN

BCN engagement

- **Align on daily scope at start of BCN day**
 - Provide input/ share prioritization of daily deliverables
 - Manage scope to BCN working hours: 9:30 am to 7 pm IST
- **Agree on update cadence**
 - Daily EOD email updates
 - Zoom video calls (as required)
- **Regularly provide feedback**
 - Ms Teams group for closer co-ordination
 - Provide continuous feedback on BCN output
 - Share context on emerging overall answer

Post-engagement

- **Share final materials** and outcome wherever possible
 - Relevant snippets from final client deck are helpful to drive continuous learning for BCN
- **Schedule a 2-way feedback session**



Assign POC for smooth engagement



Daily updates via Zoom/Teams



BCN as a thought partner



Regular feedback on BCN output

BCN kick-off email template

Hi Saumya,

Hope all is well. We started Project Vantage (case code - **M2SG**) and would love to work with your team on a few outside-in research topics, **beginning 3/12 morning** (India time). Is your team available this week?

The Target is a company called [REDACTED], a provider of incentive compensation management (ICM). We have the interim report from CDD here [240301 Project Vantage Interim readout v1.pptx](#). Pages 7-12 are the most helpful ones. I've shared the CDD deck with Saumya and please give access to the team members.

We want your support in analyzing the company's tech stack and R&D organization. Both requests involve a scraping of LinkedIn profile as the first step. If you find it will take the team more than one day to complete both requests, please prioritize task number 1.

Scraping request:

- We would you like to scrape LinkedIn of to understand 1) tech stack and architecture of Vantage product, 2) the breakdown of R&D vs non-R&D employees for Vantage

1. Tech stack and architecture (top priority)

- Context:** Using LinkedIn, please scrape data on all current technical employees at Varicent, focusing on roles such as product, engineering, QA, tech leadership, etc. Exclude IT-related roles from this search. Review their LinkedIn descriptions and extract any information relayed to architecture components/structure and programming languages. Our goal is to understand the presentation layer (front end), business layer (back end), data layer, and hosting infrastructure
- Expected output 1:** Compile all the extracted data into an Excel sheet with the following columns: link to the employee's LinkedIn profile, tech stack layer, technology mentioned, architecture component mentioned
- Expected output 2:** Please conduct a general internet search (company website and technical documentation, blogs, LI posts, etc.) to find any available architecture or data flow diagrams related to Varicent. If you find any relevant diagrams, compile them into a Word document or provide links to them in an email back to us. Spend no more than one hour on this task. If you cannot find anything/very much we will ask on expert calls

2. Composition of R&D org

- We only need a total count of non-R&D employees, and we don't need a detailed scrape on non-R&D employee (e.g., tenure, skills, etc.). Please include any implementation-related role
- Expected output 1:** please send up a backup excel file that present in aggregate, the number of R&D employees (filter by "R&D" titles), years of experience at the Target company, technical skills (developers, architect, QA, Security, Product Management), geographical location, using a list of tech-related keywords that come up in their profiles (e.g., Java, SQL, Front-end development, Python, etc.)
- Expected output 2:** please send us a the list of Vantage's R&D leadership team, their names, titles, years of experience, prior work experience. For this request, please verify with company website and other sources if available.

Happy to hop on a call to provide context if helpful.

/ ILLUSTRATIVE

①

②

③

④

⑤

① Project name, CC, expected start date

② Details on target, company website link, relevant reading materials

③ Defined priorities

④ Context related to tasks, share A1s (if any), expected output

⑤ Set-up kick-off call if required

Reach out to Saumya to engage a BCN team

AGENDA

Product and Roadmap

Product History / Evolution

Product Roadmap

Competitive Benchmarking – Feature Matrix

3rd Party Integrations

UI/UX Assessment

Customer Sentiment

Organization & Processes

Technology & Architecture

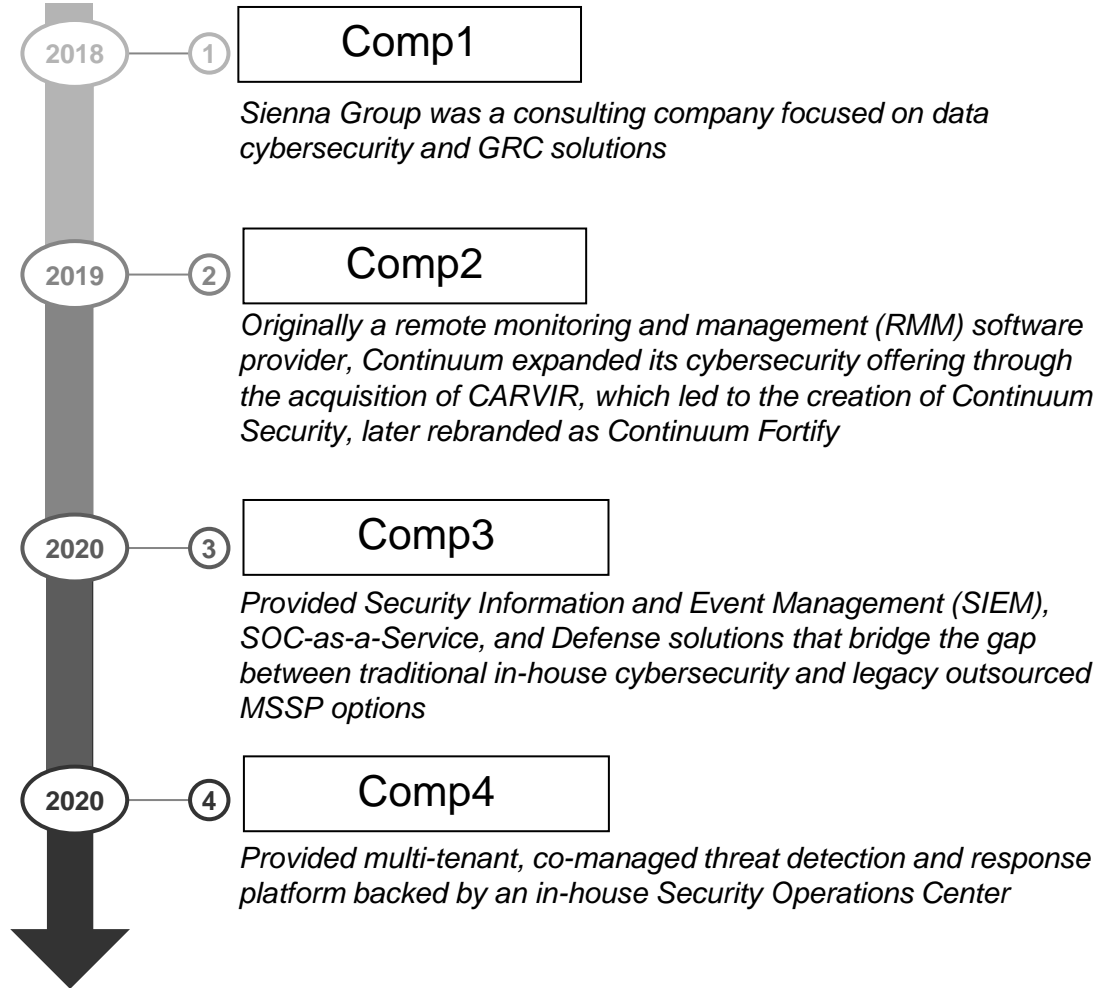
Target's Cybersecurity, largely based on Continuum acquisition, offers a range of solutions primarily focused on Risk Assessment, Endpoint detection and SIEM

TARGET

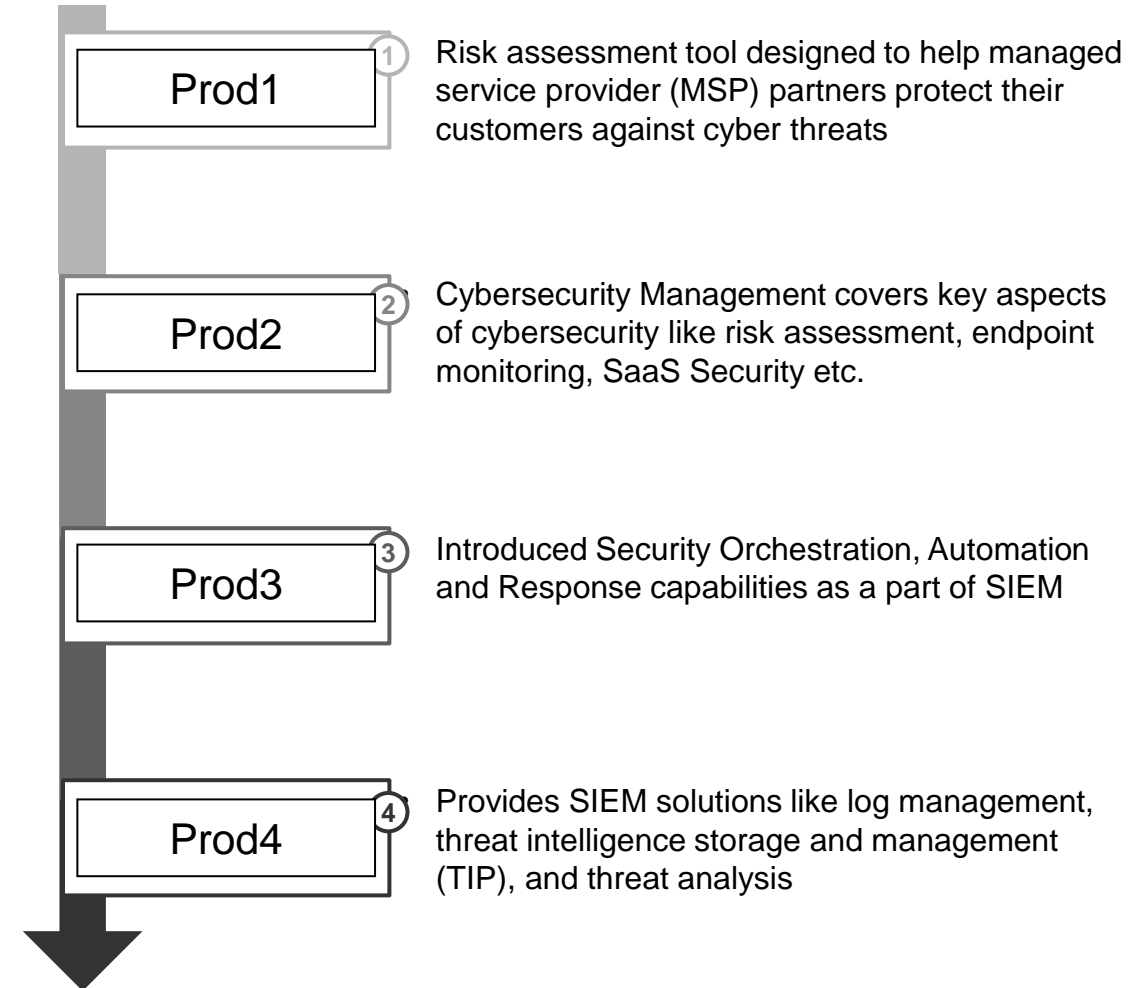
PRODUCT HISTORY

Product Evolution

Key Cybersecurity solution acquisitions



Current iteration within the Cybersecurity portfolio



Source: Bain Analysis

Early acquisitions of Target provided scale benefits to enable growth, later acquisitions by Target accelerated entry into new markets and strengthened product offerings

OVERVIEW

ACQUISITION HISTORY

Key:

Change in Target ownership

Acquisition by Target

Product Evolution

Acquisition history

Deal size



Source: Company websites and press releases

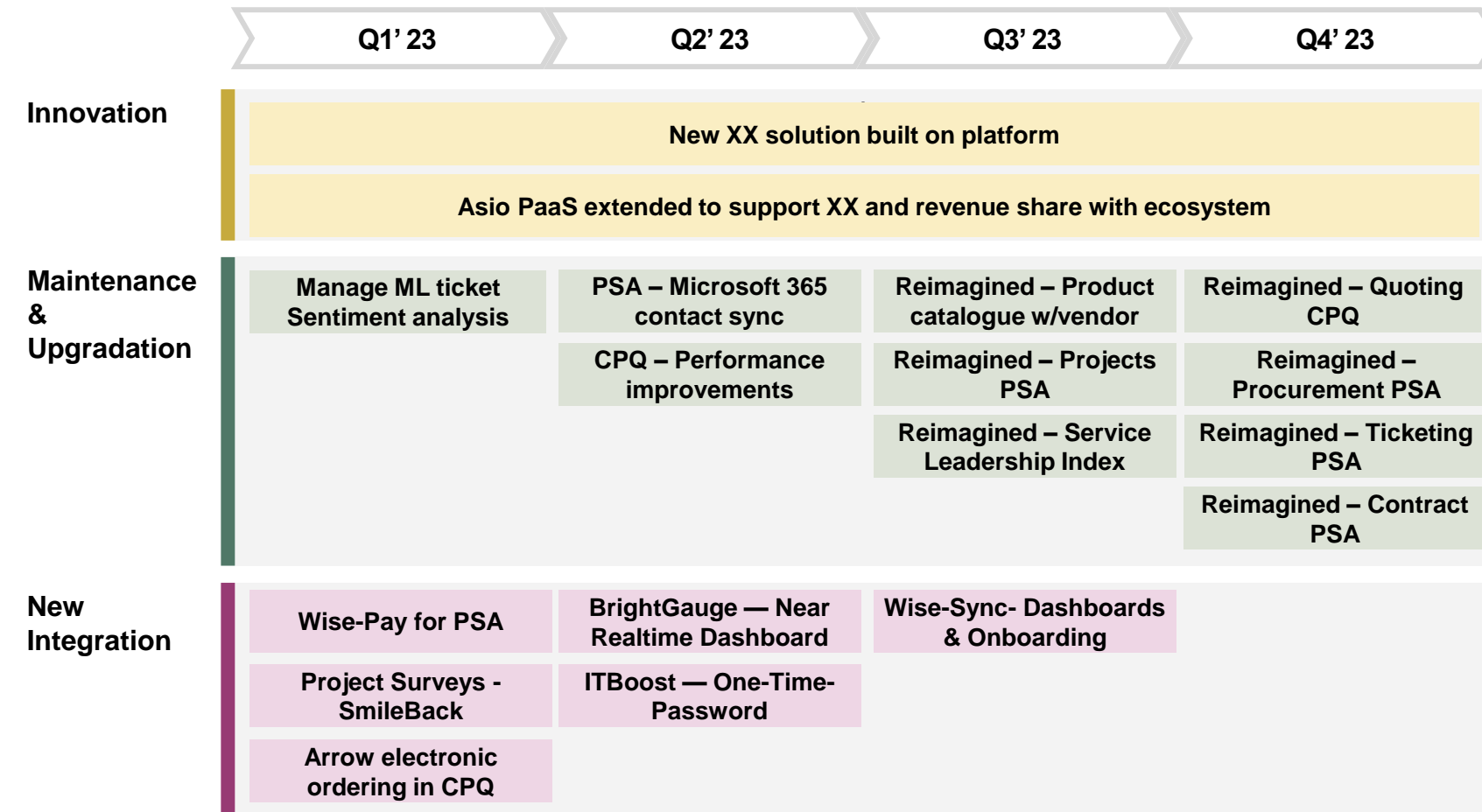
Target aims to strengthen its platform by building new XX solution along with upgrading and integrating multiple capabilities in 2023

BUSINESS MANAGEMENT

ROADMAP

Roadmap

2020-2023 roadmap



Commentary

• Innovation

- Launched unified platform in late 2021. Now in 2023 advancing to build XX solution on the same unified platform
- Target's **platform** introduced first MSP PaaS solution in 2022
- Plan for additional offering of New platform ticketing and service in 2023

• Upgradation

- During 2023, Target plans to upgrade almost all its capabilities under XX solution - Manage (PSA), Sell (CPQ), Service Leadership and Sync (Payments) etc.

• Acquisitions

- After acquiring multiple companies in years 2020-2022 (IT Boost, Service Leadership and Sync), Target in 2023 is aiming to integrate all the services offered by those players into its own eco-system

© Target's roadmap is primarily informal and undocumented; IT costs across all critical initiatives difficult to assess due to limited information

TARGET

STRATEGY AND SPEND

IT Roadmap

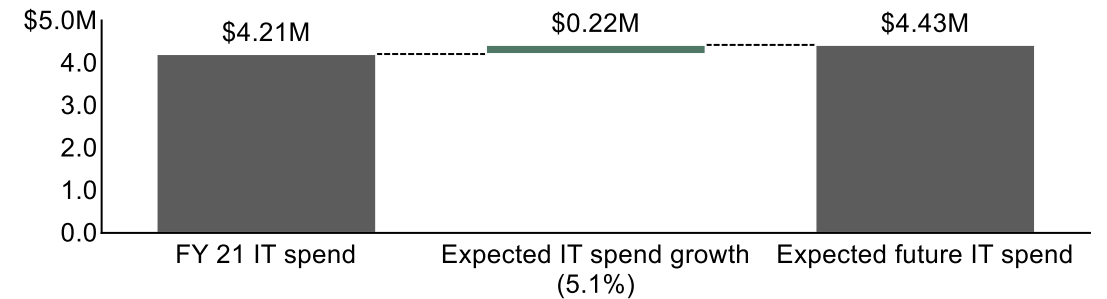
IT roadmap

- Target's product management process is primarily informal and undocumented; lacks a detailed roadmap and estimated timelines with only high-level projects being tracked
 - IT strategy focused on consolidating WMS platform into a single system and streamlining overall business operations
 - Presently in the early stages of creating IT and operational documentation without a focus on technology modernization
 - Planned acquisitions in the future which can potentially add new WMS to the tech stack, until the software's can be fully integrated
- Several initiatives undertaken by management; however unable to assess feasibility due to lack of progress tracking
 - Target is in the final phase of consolidating all billing to the new XX application; small parcel billing also to be consolidated
 - In the process to migrate clients from High Jump and CORE to A360; High Jump clients to migrate by January 2023 and CORE by the end of 2023
 - Target is also working to modernize warehouse operations including Pick-to-light process implementation, introducing bot and drone technology for automated inventory management
- Conducts yearly A360 summit/ periodic reviews to build yearly goals for the systems
 - Product feature requests are driven by clients as well as internal initiatives – currently, two client features in the development backlog as per the management
 - Project requirements associated with A360 platform are added to the Monday.com tool for tracking
- Developments planned for A360 to streamline operational database; however technical details and timelines are unknown
 - Plan to have a single central database, and migrate it to SQL Server cluster over the next 1.5 years

IT spend

- Target's IT spend is \$4.2M, which represents 2.5% (lower than the industry benchmark of 3-4%*) of the total 2021 revenue (\$168.4M)
- Target's management expects to increase its IT OpEx by 5.1% in the future

IT spend (in \$M)



- Computer costs (costs related to servers' rent expenses, online payment fees or ERP subscription) have increased by 75% from \$0.8M in FY19 to \$1.4M in FY21
- The labor costs of IT department have grown by ~125% from \$1.1M in FY19 to \$2.5M in FY21. These costs have been incurred to implement strategies like:
 - Integration of 10 Moul staff in 2021 to reduce outsourcing
 - Development of an in-house operational tool
 - Elimination of Moul's system and integration of new client accounts within the existing system
- Target lacks robust documentation for IT CapEX, spend for applications/ vendors, and other SDLC processes, that prevents it from capitalizing development costs and enhancing EBITDA

Note: * based on Gartner's "IT Key Metrics Data 2021 - Industry Measures" report | Source: Project Pace IT and Cyber DD reports

Unlike most of its peers, Target has formed partnerships with third-party vendors across broad range of cybersecurity products and services












CYBERSECURITY

VENDOR OFFERINGS

Competitive Benchmarking

Vendors' inhouse IP vs. leveraged 3rd party software

3rd party software Inhouse IP No offering Via acquisition

	Products							Services	
	SIEM	EDR/MDR	Cloud app security	Vulnerability management	Identity management	Endpoint policy management	Secure access	SOC	Incident response
Target		  Bitdefender	 Microsoft Cloud						
Kaseya									
N-ABLE									
blackpoint									
HUNTRESS									
ARCTIC WOLF									
WEBROOT <small>an opentext company</small>									
SOPHOS									

Offers via partnering with Carbonite, under its same parent company

Source: Project Target; Bain Analysis

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Majority of Digital and Neo Banks are monetizing through interchange; although they are continuously expanding their product suite

COMPETITIVE LANDSCAPE

Competitive Benchmarking

US Neo Banks and Digital Banks

Valuation / # MAU



Products		Varo	Chime	Ally	Acorns	Greenlight	Current	Acorns	Ally
	Checking/savings accounts & debit/prepaid cards								
	Investment products								
	Installment loans								
	Student loans								
	Credit cards			No longer available				Credit builder	
	Home mortgages								
	HELOC / home equity loans								

“Usually, they start and scale one vertical and then quickly expand to another. And quite frankly, it's just a matter of years before all of these entities start to look like one another. Usually, the ones that start in savings and checking migrate to is lending, and then beyond lending it's in investing. If you start in the investing world, the next natural place is transaction income. So debit cards, credit cards, etc.”

= First product launched

= Product added over time

Source: Lit. search.

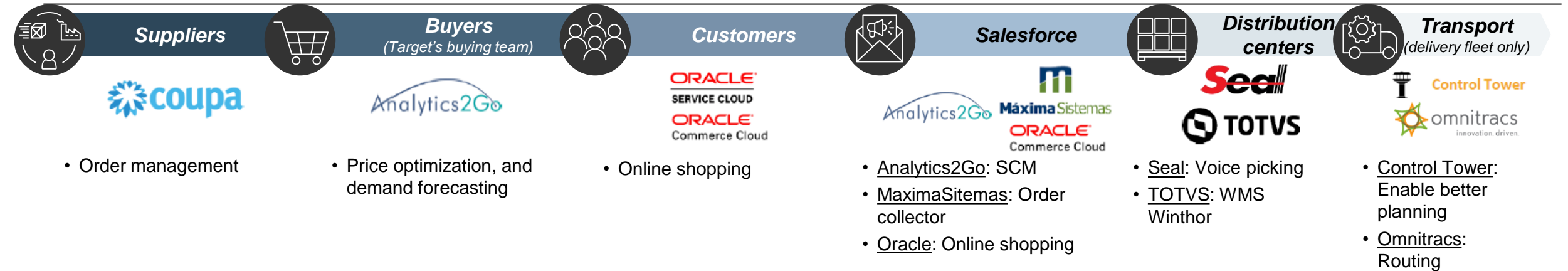
Target relies on several third-party software across its service value chain with tech acceleration mainly driven by acquisitions/ partnerships

COMPANY

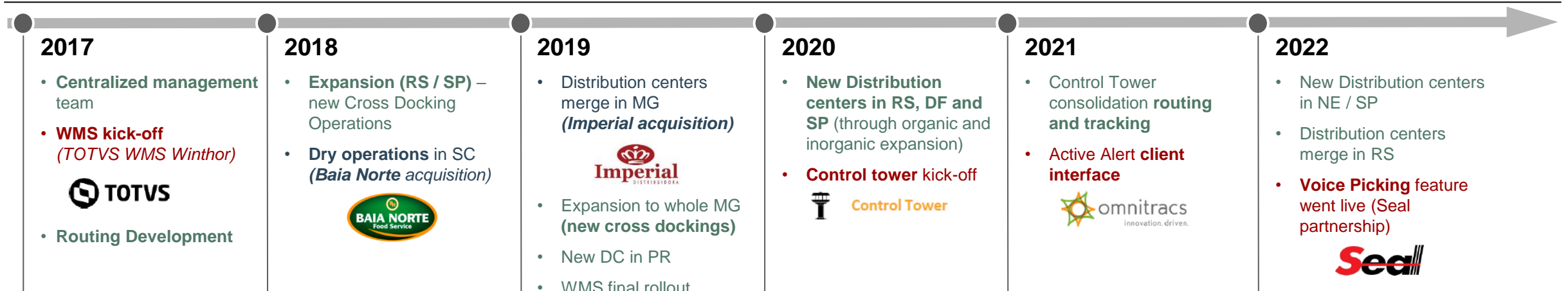
TECH OVERVIEW

3rd Party Integration

Target relies on several third-party software across its value-chain



Target's operations evolution and technology development





Notes: MG = Minas Gerais; RS = Rio Grande do Sul; SP = São Paulo; DF = Federal District; SC = Santa Catarina; NE = Targeteast
Source: Management data

■ M&A ■ Development/ expansion ■ Partnerships

Company overview

Founding year	1983
Headquarters	Sao Paulo, Brazil
Size (employees)	~12K
Size (revenue)	\$717M* (FY 2022)
Funding	N/A
Key investors	N/A (became public in 2006)
Regions served	Brazil & LATAM (development centers in US & Mexico)
Fee structure	Subscription model

Partnerships/ recent developments

-  **Supplier**
- Construction of a **B2B technology** in 2020 to **consolidates the offering of Techfin** service after the acquisition of Supplier Participações
- ³
- Partnership** between **Comp1** and **B3** to create **Dimensia**, company focused on B2B technologies for financial market and fintech

Key customers

Comp1 has 1.8K+ customers in Brazil and manages 2M sqm+ of warehouse space



Note: *Consolidated revenue of the company and its subsidiaries; Employee count taken from LinkedIn as of April 2023
Source: Company website, Press releases; Crunchbase, LinkedIn, Lit. search

Key features



Focuses on AI-based solutions

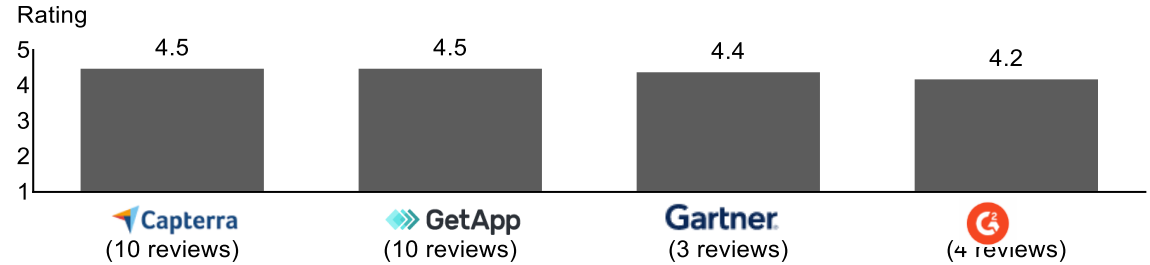


Integrated into Management, TechFin, and Business Performance solutions

Products/ services offered

Services	Details
ERP	• Integrated software management , social networks, real-time reporting, with cloud storage (SaaS), or traditional storage
WMS	• Functionalities like SAAS, Protheus Line, Datasul Line, Logix Line & Winthor Line for warehouses & distribution centres
Business Intelligence	• Features data integration, big data, processing services and insights delivery
Fluig	• Productivity and collaboration platform that integrates with the ERP system and company's other systems
HR Solution	• Complete solution from personnel management to human capital management

Service rating



Target provides broad functionality satisfying the requirements of SMB vertical within distribution but does not include any differentiated features

User Interface



Areas of differentiation and gaps

Highly integrable and flexible

*"With Comp1, the stock side and the **flexibility** are there. We don't seem to have to tailor our business to fit the software, instead, the **software fits us.**"*
~Hyde Park Tiles

Wide range of functions

*"It was the **breadth of functionality** offered by Comp1 that made it appealing."*
~Dene Evans, Partner, Devant Designs

Lack of customer support and complex company processes

*"The **quality of support** & overall **implementation process** is **very archaic, slow & not comprehensive**. The overall quality of system is fine, but is let down by the company processes, the PSG resource, and support staff."*
~Gary P., Self-employed

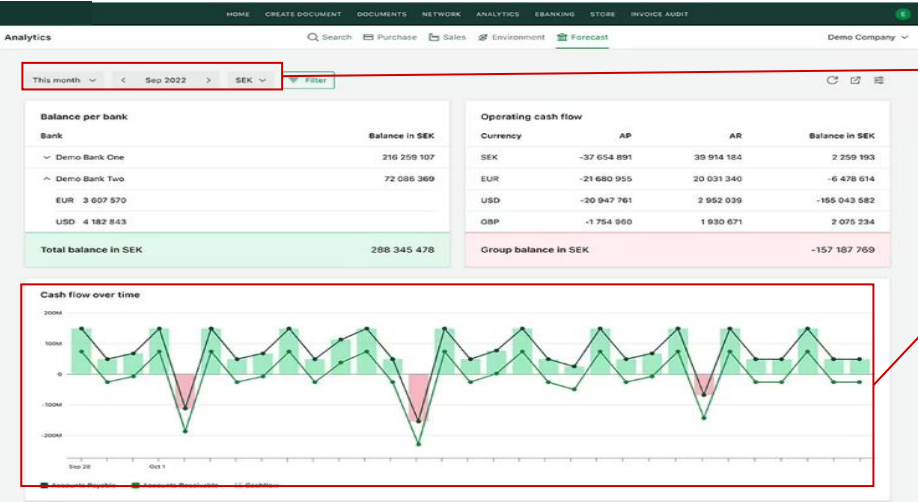
Source: Company website; Secondary research

Commentary

- Integrated cloud-based solution specifically built for **small to medium businesses in distributive trade**
 - The product is currently **under development**. Current iteration is based on **IQRetail** (Historic Comp1), until the new strategic Comp1 is developed to target the same SMB segment, with customer migration expected to begin from Feb-2025
- **Order/Quote Management** – Sales processing from quotation to order management with features such as: quick invoice creation, view of pending deliveries and customer payment status
- **Inventory** – Flexible stock management with features that enables user to change prices, description data, and physical location across stock
- **Purchasing and Supply Chain** - Supplier management with intuitive features such as: "Supplier lists" which help automatically switch to a cheaper supplier when current supplier increases its price
- **Accounting and Reporting** – Insightful dashboards and reports with information related to financials, sales, stock, etc., presented in graphical format
- **Layered Applications** - Add-on applications to enhance software's functionality. Comp1 integrates with solutions such as:
 - In-house: ePOD (Delivery Cycle Management App) to capture proof of delivery electronically, eSales (Mobile App)
 - External: Dojo (electronic payments solution) to process card payments, Phocas (BI Platform)

Target’s UI/UX exhibit thoughtful design, ensuring user-friendliness; Incorporates a pleasing color palette and intuitive features

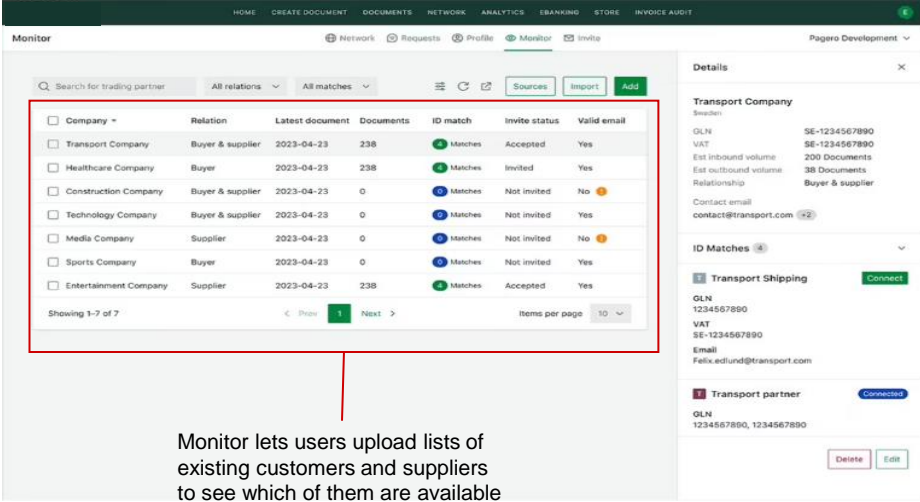
E-invoicing




Time period and currency filters

Real-time visibility into AR/AP, DSO forecasting based on historical data

Network



Monitor lets users upload lists of existing customers and suppliers to see which of them are available on Network

Dimension	Assessment
UX 	Configurability <ul style="list-style-type: none">Can the platform be configured accordingly for different user types / brands / product types?
	Flexibility <ul style="list-style-type: none">Does the platform enable a range of ways of performing specific actions (e.g., multiple ways to build a submission?)
	Automation <ul style="list-style-type: none">Does the platform offer automation capabilities (e.g., RPA, workflow automation, self-service)?
	Modernity <ul style="list-style-type: none">Does the UI have a modern look and feel?
	Ease of use <ul style="list-style-type: none">Is a common design theme used across different screens?
	Consistency <ul style="list-style-type: none">Is the interface intuitive to navigate?

TBD by case team

(Please refer to the excel for more details)

UI/UX: [Target] performs good overall, especially on products & solutions pages; [comp] also has a good interface (1/2)

WEBSITE

USER EXPERIENCE

● Better than peers ● Similar to peers ● Lagging peers

UI / UX

Arrival

1

Metric

Page load time

11.6s

3.5s

14.7s

3.2s

3.5s

7.2s

Home page

Clean & well-designed layout with use of pictures; well-organized with brand messaging and offerings

Short page with limited information; pictures used; brand messaging and offerings present

Well-designed page with good use of pictures & icons; well organized with brand messaging and offerings

Well-structured short page; limited use of pictures with more focus on product graphics; brand messaging and offerings present

Well-structured page; pictures used but are of low quality; brand messaging and offerings present

Well laid-out, but short page; limited use of pictures; limited brand messaging; offerings mentioned

Search & Navigation

3

Main Menu

Standard hoverable menu bar with category information and icons; lack of sub-menu options and images

Standard menu ribbon; limited sub-menu options and menu not hoverable

Standard menu bar; sub-menus available, but no details and icons; menu hoverable

Comprehensive menu bar; sub-menu available, but no details or icons; menu hoverable

Standard menu bar; sub-menus available, but no details and icons; menu hoverable

Comprehensive menu bar with graphics and extensive categorization present in sub-menu; menu hoverable

4

Master Search

Available but is not predictive

Not available

Predictive search available

Available but is not predictive

Available but is not predictive

Predictive search available

Products & Solutions

5

Ease of booking a demo

Option available on the top-right of the home page; form requires just the basic details

Option available on the top-right of the home page; form requires additional details like company size

Option not available directly on the homepage; accessible through 'contact us' page, form requires basic details

No demo-request option (can contact sales team through a form on contact us page)

Demo-request option not present on home page; accessible through solutions pages and requires basic details

Option available on the top-right of the home page; form requires additional details like company revenue

6

Products & solutions layout

Well laid-out, easy-to-follow solutions page with a clean design; provides short descriptions, links to learn more or book demo, value propositions present; customer team names mentioned with photos

Well laid-out, easy-to-follow solutions page with a clean design; provides short descriptions, links to learn more and a common link to book demo

Well laid-out page with scrollable menu and collapsible topics; verbose descriptions, links to learn more and a common link to book demo

Short page with limited overview on solutions & products; value proposition mentioned

Well laid-out, detailed, and easy-to-follow solutions page with a clean design; provides short descriptions, links to learn more present

No overall solutions overview page available; on solutions pages by business need, information is well laid-out with links to explore products; no direct link to book demo

Note: Page load time determined on webpagetest.org with test location in Virginia and connection set to FIOS (20/5 Mbps) | Source: Company websites as on 9th Sep'21, Bain Analysis

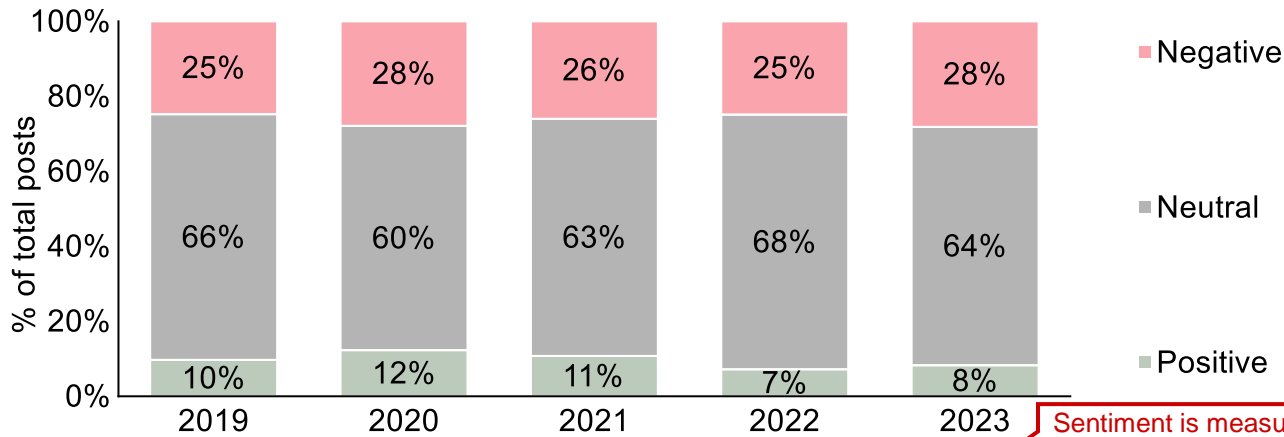
Reddit: Comp1 and Comp2 communities have both demonstrated consistent neutral to positive sentiment amongst most forum discussions in the past five years

BCL COMMUNITY

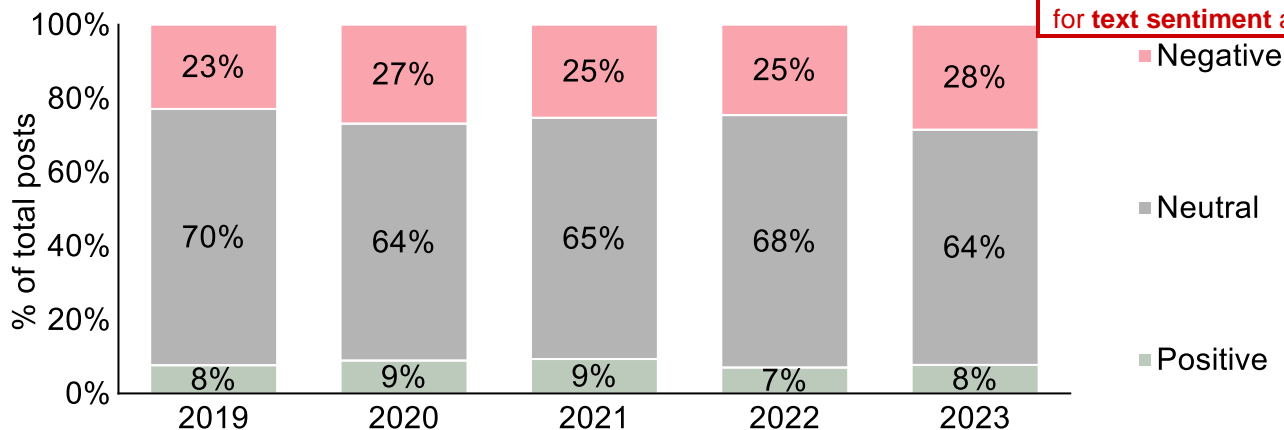
CORE ENGAGEMENT – FORUM SENTIMENT

Customer Sentiments

Reddit subreddit post sentiment – r/Comp1



Reddit subreddit post sentiment – r/Comp2



Sentiment is measured using **RoBERTa**, a pretrained natural language processing model that is **commonly used** for **text sentiment analysis**

Key takeaways

- Both Comp1 and Comp2 have **not experienced material shifts in sentiment** over the past five years, with the split between positive, neutral, and negative posts staying relatively consistent
- The **consistency** of sentiment is a **positive indicator**, as it speaks to the lack of major persistent issues within the community
- Notably, a **high proportion** (~75%) for both Comp1 and Comp2 posts, **having a positive or neutral sentiment on Reddit is a positive indicator** as sentiment in technical subreddits can often skew more negative
 - Technical subreddits are typically used to troubleshoot technical bugs and issues (see *slide next slide for example posts*), with posters often expressing their frustration with technology. This dynamic can lead to a stronger negative sentiment across posts within these subreddits

Note: Yearly sentiment breakdown is an aggregate of the sentiment scores across all posts within that year. Sentiment scores for each post provide a % breakdown of the post's positive, neutral, and negative sentiment
Source: Reddit post API

Reddit: Posts for Comp1 and Comp2 are generally positive or neutral, with the negative posts primarily concerned with one-off issues such as package bugs

Reddit post sentiment samples

Sentiment	Example post	Comp1	Example post	Comp2
Positive ~8% of posts	"I wanted to take a moment and thank all the folks that are developers for Comp1. What a wonderful experience so far. I've been away about two years from using Comp1 Tumbleweed and I must say that the experience so far is incredible . It was back then and is even more so now. Thank you for your devotion and passion in developing one of the finest Linux distributions available ."	Reddit user 1	"I am really glad that I made the decision to move from Ubuntu to Comp2 . It is so beautiful, elegant, attractive , and with its different color scheme and different terminal it feels like a breath of fresh air ! I also noticed everything runs extraordinarily fast on Comp2, apps open and browsers load pages instantly. On Ubuntu there was about 10-second delay... I already like Comp2 so much that I question my idea to move to Arch."	Reddit user 4
Neutral ~66% of posts	"I am thinking of testing out a frankenleap where I opi a few choice programs (emacs, variety, rip grep, etc.) When adding these should I keep the repo that it asks me too? The factory, if I don't keep the repo will the software continuously update? "	Reddit user 2	"I want to know what is the best approach when it comes to installing and setting up a development environment for making qt desktop applications. Does anyone know a website or tutorial that explains this? Like should I download and install qt-creator using the dnf command or just download an installer from their official website?"	Reddit user 5
Negative ~25% of posts	"It had to be the ##### German way . There is no .bashrc and when creating it and adding the code to modify the prompt color its doesn't work. How on earth is this done in Comp1? "	Reddit user 3	"One of the worst Comp2 releases in a long time, yesterday I installed f37 and what can I say one of the worst experiences in a while , as soon as I finished installing the system it completely stuck, I tried to enter through tty but it was still completely freeze ...I updated the system from terminal and surprise again completely stuck ... why did this happen with this release despite all the extra time they took for this release really don't know, apparently many have the same problem even in the...for many it just doesn't work honestly a disappointment for a distro that is supposedly the best."	Reddit user 6

- The majority (~75%) of posts are positive or neutral in sentiment, with positive posts generally **expressing high levels of satisfaction with the user experience** of the distros and neutral posts consisting of **tactical end-user questions** with the larger community **engaged in follow-up discussions**
- The negative posts for Comp1 are primarily concerned with software package issues such as missing font packages or difficulty installing new packages. Given the variability in the issues posted, these negative sentiment posts are **likely not indicative of broader Comp1 software package issues**
- The negative posts for Comp2 are primarily concerned with hardware and hardware driver issues such as poor battery life, flickering graphics, and overheating. Given the variability in the issues posted, these negative sentiment posts are **likely not reflective of broader Comp2 hardware compatibility issues**

Note: Given the similar breakdown and minimal YoY change in sentiment breakdown, sentiment averages are taken across all 5 years including both Comp1 and Comp2 post data. Sentiment %'s for individual years can be found on previous slide
Source: Reddit post API

AGENDA

Product and Roadmap

Organization & Processes

Organization Chart

Tech Leadership

R&D Team Mix – Tenure, Geography, Offshore, Attrition and Sentiment

SDLC Process

R&D spend

Technology & Architecture

Target has a sizable R&D organization totaling 127 FTEs and ~50 contractors; recent hiring strategies have increased amount of both remote and offshore resources

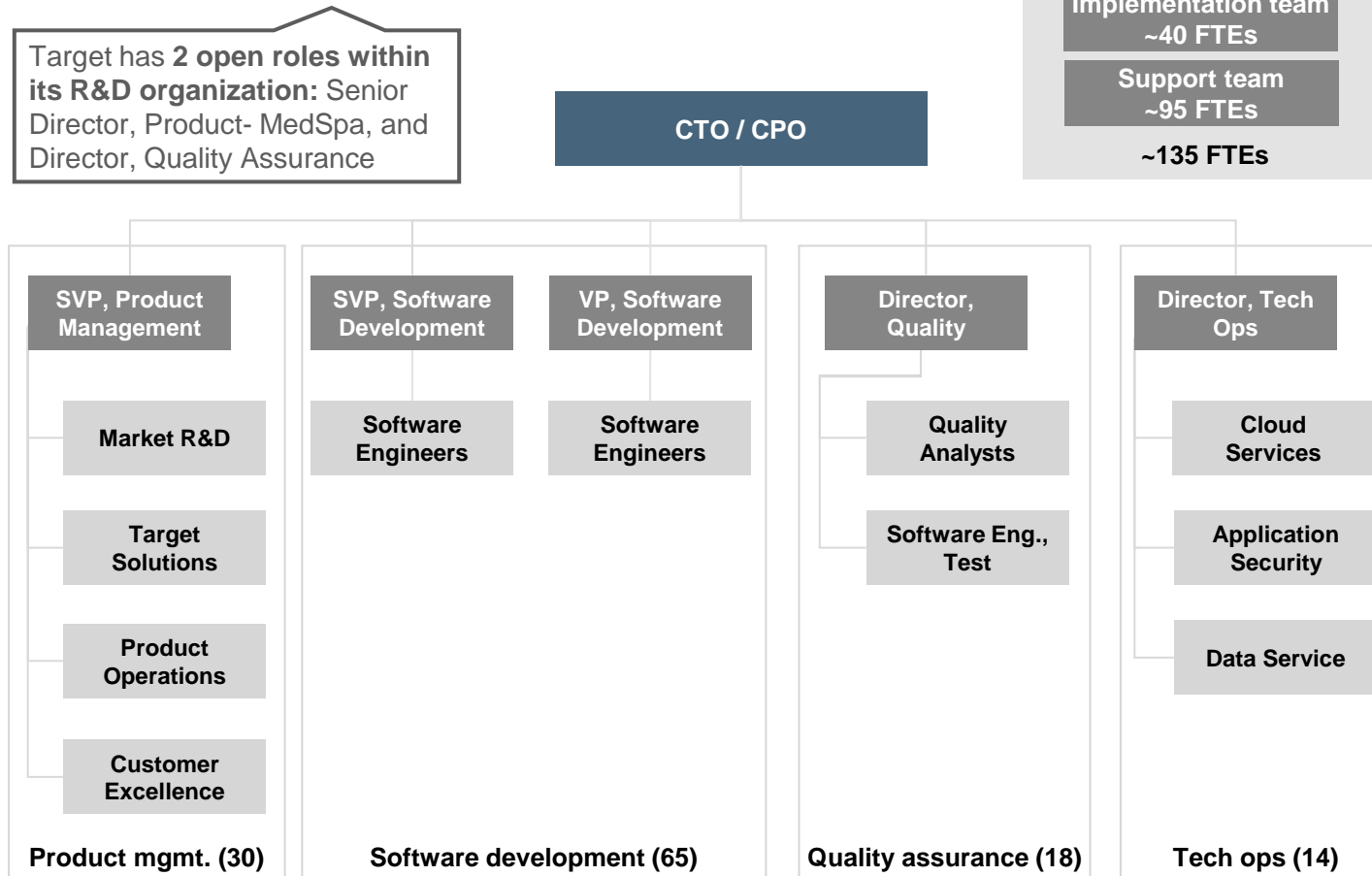
R & D TEAM AND PROCESS

ORGANIZATION CHART

Organization Chart

Target R&D organization

Total R&D resources: 127 FTEs (and ~50 offshore FTEs)



Key takeaways

- Target's technology organization **consists of cross-functional teams, comprised of product engineering and QA**, which report to the CPTO
- Target is **primarily based in the US**, with nine resources located in Canada. While **most resources are in-house**, **Target outsources** certain functions, particularly software engineering and QA
- In recent years, Target has **invested in scaling its organization** by expanding the **offshore FTE** count and increased utilization of **remote employees**. The R&D organization consists of **~40% remote and offshore FTEs** with the remaining 60% in-person/hybrid in Tampa, FL
 - Within the past 2 years, Target has hired remote FTEs from the US and Canada. Greater adoption of remote workers allows Target to access more experienced talent
- The company has **~135 resources dedicated to the Support and Implementation teams**, primarily consisting of Product Support Specialists, Project Managers/Specialists, and Implementation Specialists
 - The **Implementation team** is **responsible for customer migrations** from Select onto NexCloud

*"The people that work there now, they have an **outstanding understanding of what their market is**, what their **solution is**, and who their **clients** are. So, you have people there that are **deeply expert in those areas**. They are **really dedicated**, you'll see a lot of **long tenure** in the people that are on staff there. And so, the knowledge is there."*

Former Executive #4, Target

Note: CTO- Chief Technology Officer, CPO- Chief Product Officer
Source: Target VDD deck; Target disclosure; Bain analysis

Recently-hired executives are well-received by employees and have extensive technology experience, but are relatively new to healthcare technology

R & D TEAM AND PROCESS

TECH LEADERSHIP

Top tech leadership has seen a significant revamp with 3 executives hired since 2021



Name

CEO

- Joined Target in 2021 (2 yrs.)
- Tech leadership and advisory roles in several tech companies over the last two decades (Carbon, Dealer-FX, Sophos, MoneyStream, Onforce, Intuit)

"[Bill] I think he provides the kind of guidance the organization needs. If you look back even for the previous CEO, no healthcare background either at all. But we grew from \$40M in revenue to over \$100M during his leadership. It's the rest of the organization that brings the domain expertise."

Former Executive #2, Target



Name

CTPO

- Joined Target in 2022 (~1 yr.)
- Tech leadership roles in several companies (Book4Time, Fleet Complete, PointClickCare)
- Held advisor roles in Canadian healthcare and tech firms

"[Alan] He's definitely a solid guy. He knows his tech; he knows how to run an engineering team. He spent some time in healthcare, but he's still relatively new to it, and there are nuances. That being said he's supported by a solid team that knows their stuff. So in the grand scheme of things, he's a solid guy."

Former Executive #2, Target



Name

SVP, Product Management

- Joined Target in 2022 (~1 yr.)
- Therapy Brands: SVP Product, VP Product; TheraNest: Director Product; ChipRewards: Head of Product, Head of UX

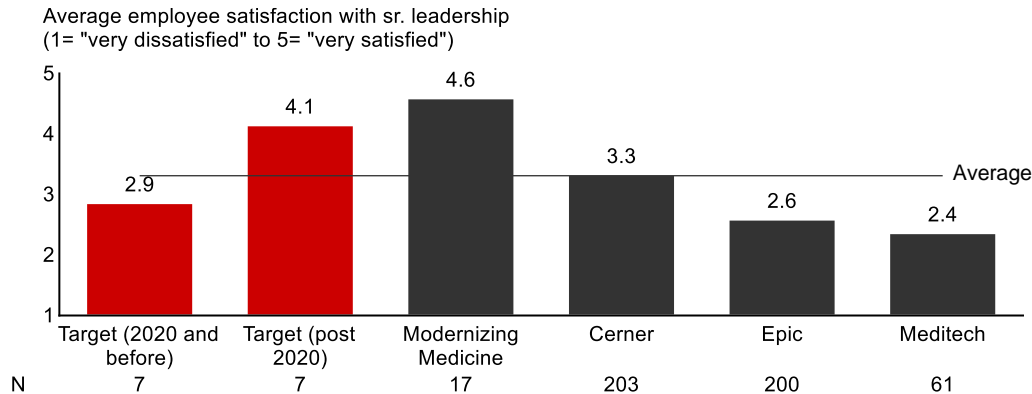
"[Tara] She has practice experience is my understanding. She's worked at a practice. She has a good understanding of practices, but the issue in my opinion is she doesn't have product experience. Her deficit is that she doesn't have good knowledge of the product process, the product discipline, and what that looks like in order to get solutions out the door."

Former Executive #4, Target

Note: Ratings are calculated considering only the R&D employees
Source: LinkedIn; Glassdoor; Market participant interviews

Tech Leadership

Tech/R&D employee satisfaction with leadership has improved since new leadership team came in



Key themes

Positive comments

"New leadership team is amazing! The company is been going through a wonderful transformation since the new senior management team has been put in place."

Product Support Representative (2021)

"Great teamwork, collaborative, flexibility, paid holidays and great benefits."

Product Analyst (2023)

Negative comments

"Target has expanded so quickly in the past few years that very few people in upper management have been with the company long enough to understand software. Restructuring of teams has left some people without a clear directive, and the gaps can go undiscovered for years."

Implementation Specialist (2022)

Product and software development middle management has significantly higher tenure than executives with an average tenure of ~10.5 years

R & D TEAM AND PROCESS

MIDDLE MANAGEMENT

Tech Leadership

Software development middle management (Average tenure: ~12.8 years)

Title	Experience	Target tenure
SVP, Software Development	<ul style="list-style-type: none"> Progressed internally to role of SVP Worked at Raymond James Financial as Application Security Engineer 	~15 years
VP, Software Development	<ul style="list-style-type: none"> Worked in software development leadership roles at Agile Thought, Datis HR 	~2 years
Sr. Director, Solutions Architecture	<ul style="list-style-type: none"> Worked as architect in Backbase, Fleet Complete, PointClickCare, etc. 	~1 year
Director, Product Delivery	<ul style="list-style-type: none"> Worked as Agile Director in Fleet Complete, Prodigy Game, Dealer-FX, etc. 	~1 year
Director, Software Development	<ul style="list-style-type: none"> Working with Target since 1997; joined as a Software Developer 	~26 years
Sr. Manager, Software Development	<ul style="list-style-type: none"> Working with Target since 2000; joined as a Software Developer 	~23 years
Sr. Manager, Software Development	<ul style="list-style-type: none"> No information available 	~17 years
Sr. Manager, Software Development	<ul style="list-style-type: none"> No information available 	~17 years

*"The team [below the executives] is pretty solid. The same team worked with me and for me, **they're really solid – they know the industry, they know the customers, they know the product.** They've been around the block a few times when it comes to regulations, and interpretation of those rules."*

Former Executive #2, Target

Product management middle management (Average tenure: ~8.8 years)

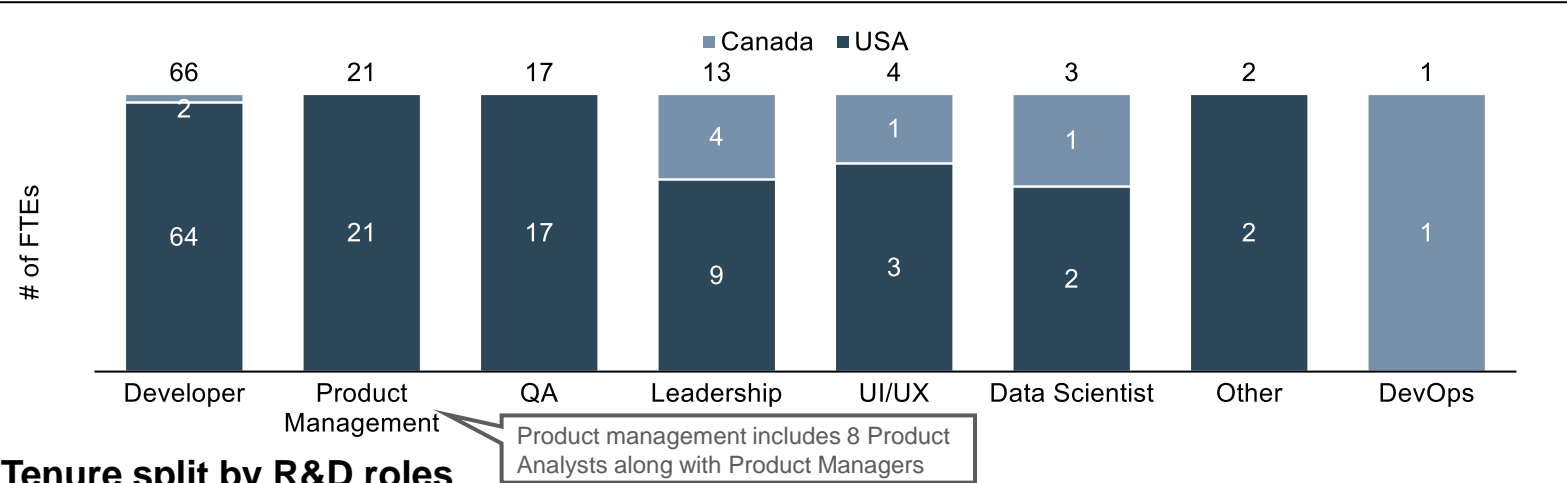
Title	Experience	Target tenure
VP, Target Solutions	<ul style="list-style-type: none"> Worked as Chief Operating Office at Optimal Management Solutions 	~2 years
Senior Director, Product Management	<ul style="list-style-type: none"> Joined as Director, Client Services and internally promoted to Director, PM in 2019 (~4 yrs.) 	~25 years
Senior Director, Product Operations	<ul style="list-style-type: none"> Worked as VP of PM at MDLIVE Inc. for ~4 yrs. 	~4 years
Director, Product Management	<ul style="list-style-type: none"> Held PM positions at companies such as Salucro Healthcare, Apriva, Syntel 	~2 years
Dir., Interoperability and Customer Excellence	<ul style="list-style-type: none"> No information available 	~0.5 year
Senior Product Manager	<ul style="list-style-type: none"> Worked as Implementation Supervisor at SRSsoft 	~18 years
Senior Product Manager	<ul style="list-style-type: none"> Experience in product management (~7 years) working at Greenway Health 	~4 years
Senior Product Manager	<ul style="list-style-type: none"> Experience in product management and client services at companies incl. Greenway Health, JPMC, etc. 	~4 years
Senior Product Manager	<ul style="list-style-type: none"> No information available 	~9 years
Senior Product Manager	<ul style="list-style-type: none"> Joined as tech. support and internally promoted to Sr. Product Manager in 2019 (~ 4 yrs.) 	~19 years

Although some Target R&D leadership is new to the company and the healthcare industry, there is highly experienced middle management leading product and technology day-to-day initiatives

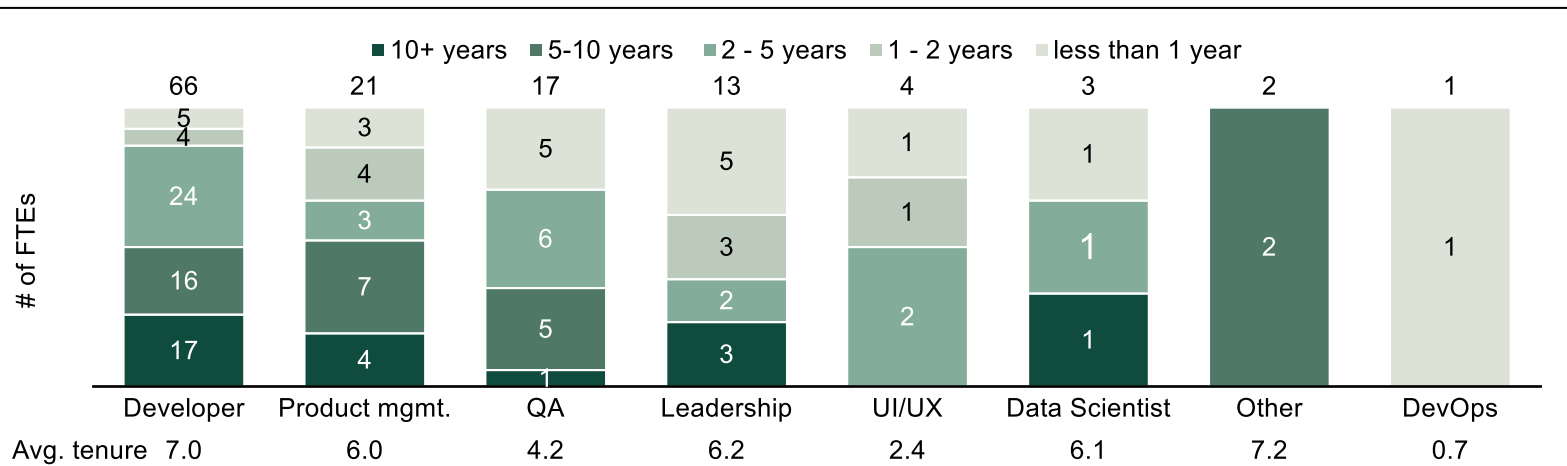
Note: Mid Management includes Sr. Managers/ Dir./Sr. Dir./VPs in Tech Org; Average Tenure calculated from Census Data
Source: LinkedIn; Target disclosure

Internal team: A majority of Target's R&D organization is based in the US (93%), with recent hiring in Canada (~7% of headcount)

Geography split by R&D roles



Tenure split by R&D roles



Key takeaways

- As expected, majority of Target's total R&D headcount is dedicated to **Engineering** (~52%), **Product** (~16%), and **QA** roles (~14%)
- Most of the R&D FTEs are in the US, with a **growing presence in Canada** (~7% of R&D FTEs) due to **recent hiring**, including **4 leadership roles**
- Target's R&D team has an **average tenure of 6.2 years**. ~44% of the team has been in the company for more than 5 years
- Six out of the thirteen current R&D leaders** (4 Directors, 1 SVP - Product Management, and the CTPO) **were hired within the past 14 months**
- Target's tech team has a **balanced Developer to QA ratio** whereas Developer to PM / Leadership ratios are slightly low (Target has more PMs/ leadership than expected)
 - Developers include **7 Team Managers** and **3 Senior Managers**

	Dev. to QA	Dev. to PM ¹	Dev. to Leadership ²
Overall	3.9	5.1	5.1
US	3.8	4.9	7.1
Canada	-	-	0.5

Note: 1) Ratio based on PMs (excludes Product Analysts) 2) Leadership includes C suite, Directors and VPs; Others include two Application Support Analysts
Source: Target disclosure; Bain analysis

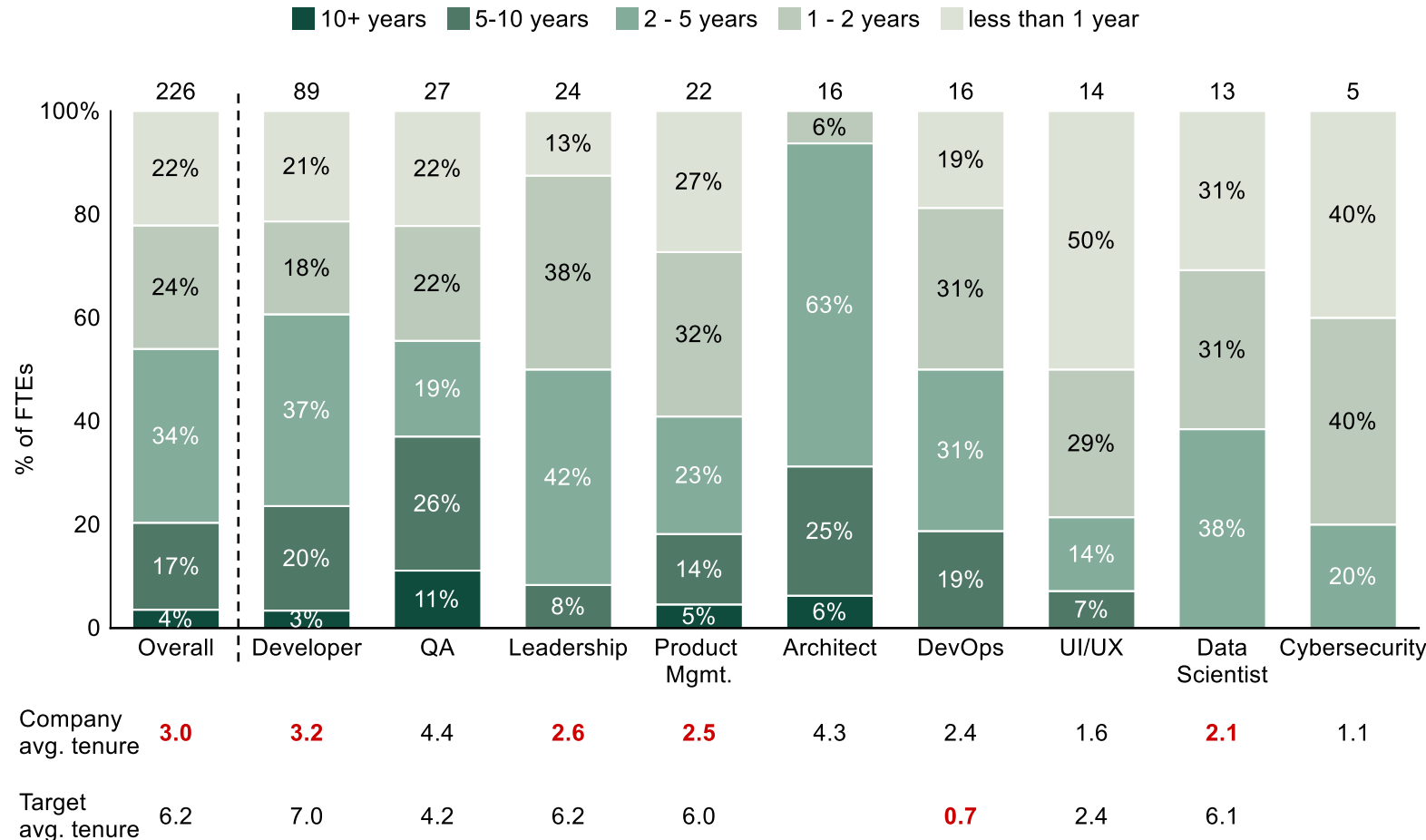
Company's R&D team has a relatively low average tenure of ~3 years compared to ~6 years for Target; ~45% of the team have less than 2 years of tenure

R & D TEAM AND PROCESS

COMPANY TENURE SPLIT

R&D-Tenure

Company tenure across R&D team roles



Key takeaways

- **~45% of the R&D team has been at company for less than 2 years**, which can impact the velocity and quality of new development **compared to Target where only ~25% were hired in the past 2 years**
 - Only ~21% of the team has been in the company for 5+ years
- Company is **less tenured than Target across most roles** in the R&D department
 - Comparable tenure for QA and UI/UX
 - Company is more tenured in DevOps where Target has only 1 FTE
- **Almost one third of the current R&D leaders** (4 engineering leads, 2 product leads, and one user experience lead) **were hired within the past 2 years**
 - No leaders have 10+ years of tenure and **only ~8% have 5+ years of tenure**
 - In comparison, **~20% of Target leaders have 10+ years of tenure**
- **Quality assurance and architect employees** have the highest average company tenure of **~4.4 years**; the **tenure of product managers, security, and data FTEs is low** relative to the rest of the R&D team

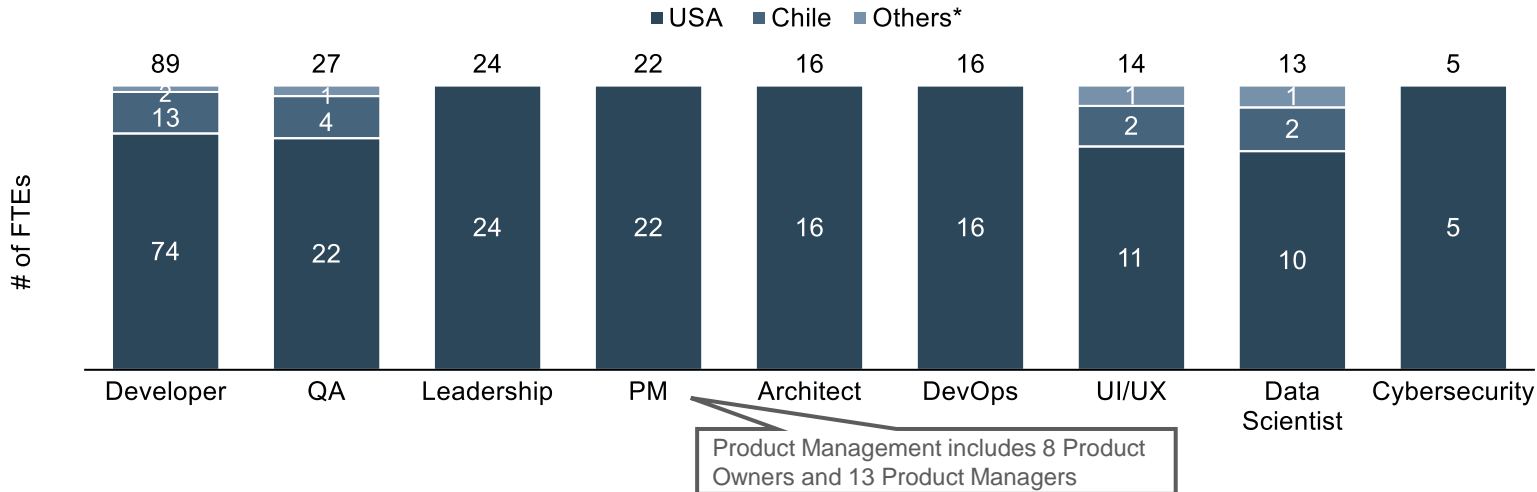
Company's R&D team resembles Target both in the USA-focused geographic presence and in terms team composition

R & D TEAM AND PROCESS

GEO & ROLE RATIOS

R&D-Geography & Ratios

Geography split by R&D roles



Ratios of roles

	Dev. to QA	Dev. to PM	Dev. to Leadership
Target (overall)	3.9	5.1	5.1
Company (overall)	3.3	4.0	3.7
US	3.4	3.4	3.1
Chile	3.3	-	-



Note: *Others include Ukraine, Romania, Germany, and Canada; Leadership includes C suite, Directors and VPs; PM: Product Management
Source: LinkedIn; Bain analysis

Key takeaways

- ~88% of company's overall **R&D team**, including all of leadership, **is based in the US which is comparable to Target** where 93% of the R&D team is in the US
 - Target's strategy to continue expanding its low-cost R&D presence via contractors may allow it to gain a cost advantage over company
- Chile accounts for 9% of company's R&D team**, while remaining employees are based in Germany (1 UI/UX, 1 data scientist), Ukraine (1 QA), Canada (1 developer), and Romania (1 developer)
- Company's tech team has a **balanced developer to QA ratio**.
 - The developer-leadership ratio may point to a **slightly top-heavy organization**
- Company **developer ratios are largely in line with Target's** across QA, PM, and leadership

Target outsources over one-third of its R&D team to several locations globally, allowing it to scale the R&D team on demand and realize cost savings

Geographic distribution of Target contractors

		
Roles	QA	Developers, PM, QA, Business Analysts
Description	R Systems is a product engineering and analytics company	Endava is an offshore outsourcing partner for product engineering and digital transformation
Founded	1993	2000
Headquarters	California, USA	London, United Kingdom
# FTEs	5.5k +	10k +
Location of FTEs	Mainly India (60%), US (10%), and Romania (5%)	55 office locations globally, with a large presence in Eastern Europe

Geographic distribution of Target contractors



Source: Target VDD deck; Target disclosure; LinkedIn; Lit. search

Key takeaways

- Target augments development teams with **outsourced resources**
 - Endava provides Developers, PM, QA, and Business Analysts. They reside in Uruguay, Macedonia, and Argentina
 - R Systems provides QA resources residing in India
- Target currently has ~50 offshore resources with **plans to continue growing its offshoring capabilities**
 - R Systems provides a small percentage of the offshore resources as their relationship with Target is newer. Target will continue to grow this relationship
- Management **lacks a clear target for the ideal onshoring/offshoring ratio**. It is important to note that there exists a **limit to the extent of recommended offshoring** due to the risks and inefficiencies it introduces, including IP protection, communication challenges, quality control, productivity concern, etc.
- Using offshore resources allows Target to **scale the R&D team up or down easily** and achieve **cost savings**
 - According to management, offshore resources cost on average **30-45% less than onshore FTEs**
- Contractors are **embedded within the in-house R&D team** and scrum teams
 - Within scrum teams, there are **internal performance tracking metrics** for each member which allows Target to identify any areas of underperformance and replace contractors if necessary

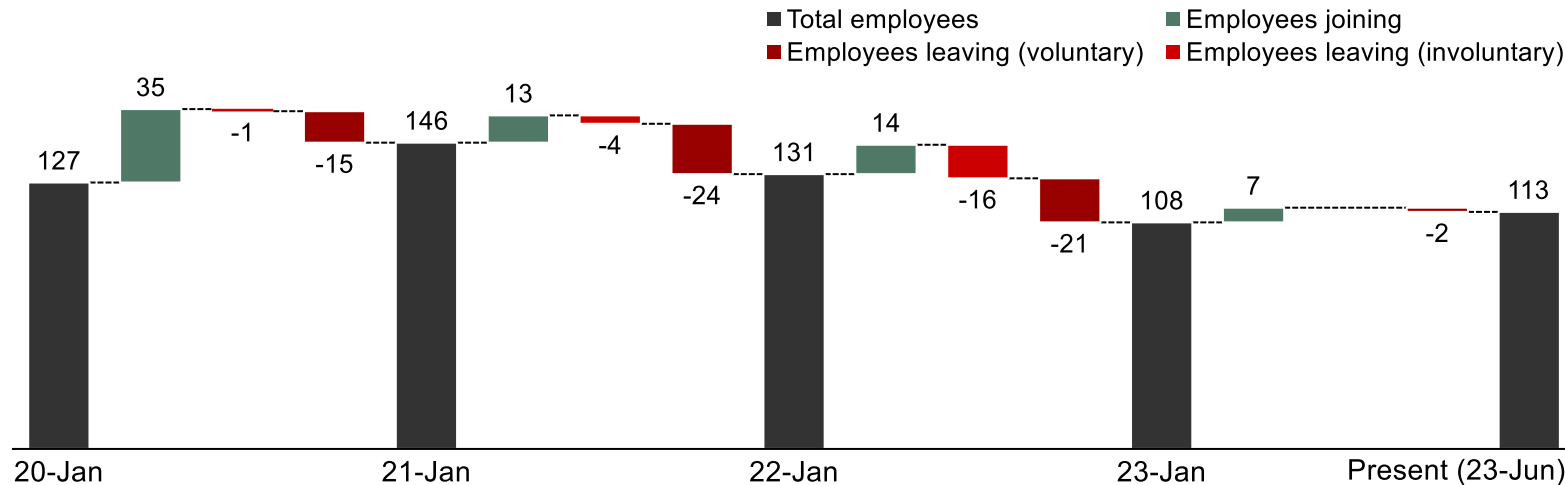
During 2020-2022 Target experienced high R&D organization attrition, indicating potential loss of domain expertise; attrition stabilized in 2023

R & D TEAM AND PROCESS

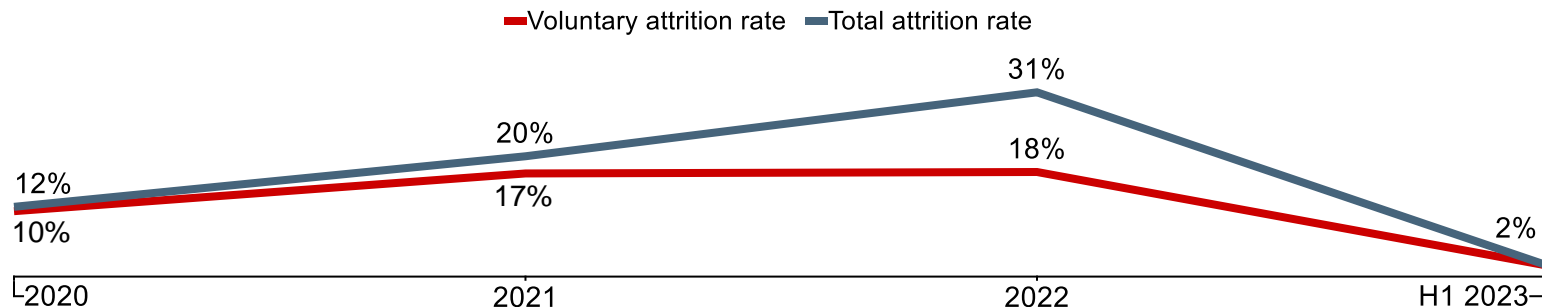
ATTRITION ANALYSIS

R&D Attrition Analysis

Target's R&D team attrition 2020 – present (July 2023)¹



Attrition rate 2020 – present



Note: 1) TechOps FTEs are not considered in this analysis given Target does not label them as R&D FTEs in census documents
Source: Management disclosure, Bain analysis

Key takeaways

- Post the acquisition by Company in June 2019, **attrition greatly increased year over year** with total attrition reaching a peak rate of 31% in 2022
 - High attrition raises concerns of loss of institutional knowledge
- Management addressed attrition in conversations with the Bain team and noted that there were **no noticeable inefficiencies or reduction in institutional knowledge**
- There was a **jump in involuntary attrition in 2022** with 13 software engineering roles removed
- Attrition was primarily from **product management** (18) and **engineering** (53) roles
- Attrition appears to have stabilized** given an attrition rate of 2% for H1 2023

"They [company] brought in their own people and micromanaged things. A lot of the other senior people didn't like the micromanaging of company from what they tell me, so they left and then company put in a CEO they knew, and that CEO brought in some of their people. A lot of the more senior people beneath them mostly self-selected to leave."

Former Executive #3, Target

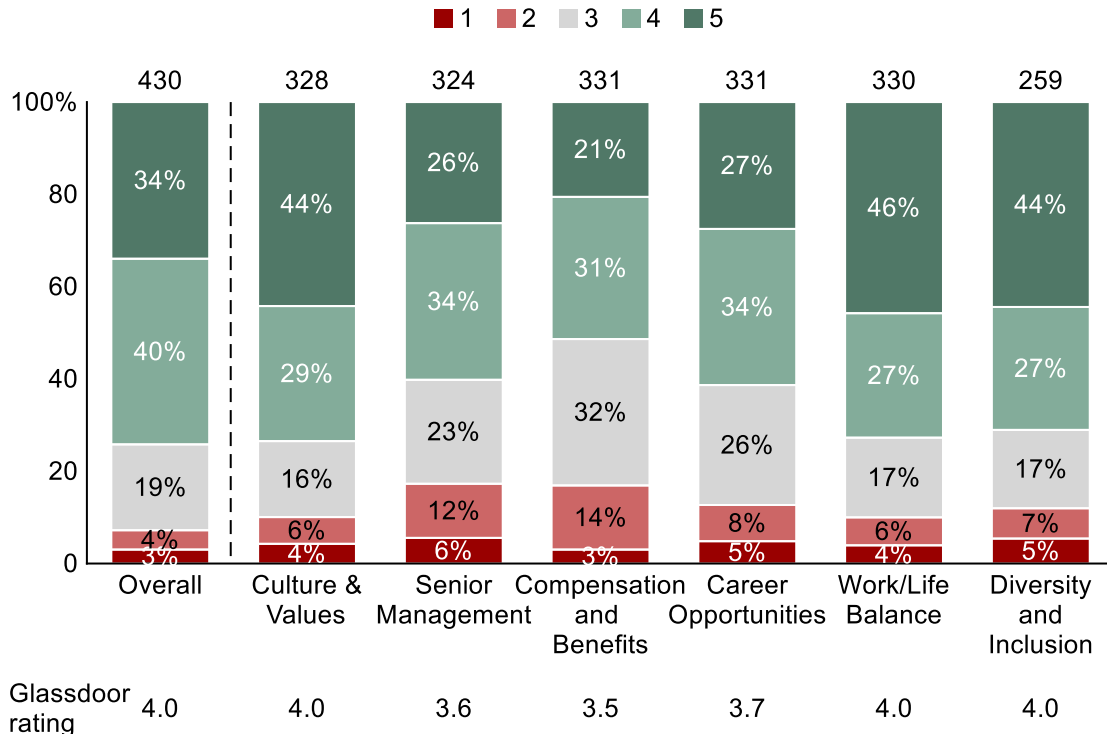
Target's employees share an overall positive sentiment driven by culture & values and work/life balance; Scope to improve on compensation and quality of work

TALENT

EMP. ADVOCACY

Employee Sentiment

Target has an employee rating of 4.0 driven by culture & values, work-life and balance and diversity & inclusion



Employee review trends



Note: Analysis done for L5Y (2019-2023)
Source: Glassdoor; Bain analysis

Positive comments cite company culture and work life balance; Negative comments cite lack of concern for quality of work

Positive comments

*"Sound corporate culture, experienced managers, care for employees, large **training base**. It is place where you can feel emotionally safe and develop yourself. Also, **good work/life balance**, personal needs are always respected without negotiations."*

- Officer (2023)

*"While working at target I **felt supported in my development** by the management, also a workplace that takes care of **life-work balance**."*

- Innovation Lead (2023)

*"**Great culture, flat management hierarchy** Cozy office with lots of additional amenities **Remote work possible** You are **free to act on your ideas** if it benefits the organization **Experimenting with latest and greatest software tech** Many **career opportunities** within the organization **Diverse people and teams**"*

- Tech Lead (2023)

Negative comments

*"Management does **not have technical experience**, resulting in **poor decisions**.. People that actually care about software quality leaves the company.. A lot of **technical debt**."*

- Tech Lead (2022)

*"Looks like **management doesn't care about quality**, and expects development team to be full stack from devops configuration to development and designing."*

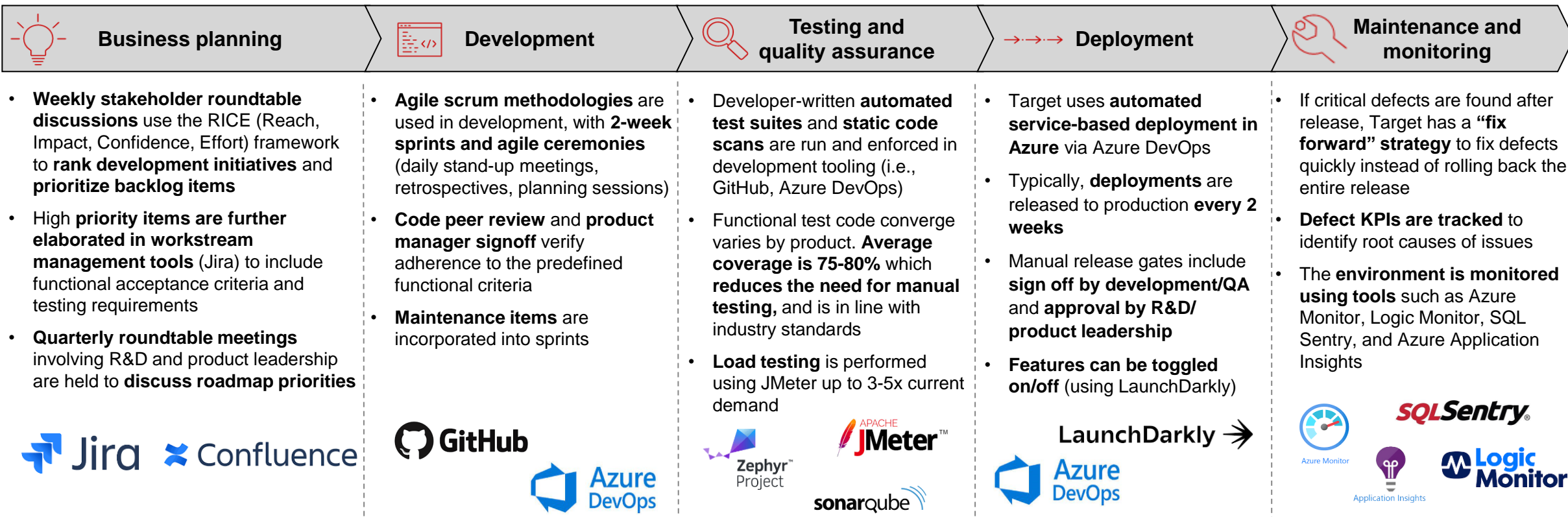
-Solution Developer (2023)

Target uses industry-standard agile scrum SDLC methodologies with adequate tooling deployed at each stage



Assessment: Negative Positive

SDLC



Expert commentary

*"We **documented the processes**, we have **clarity around the vocabulary** that we use, we have **standard ceremonies**. I think the experience I've had so far has been pretty good."*

Former Executive #2, Target

*"It's pretty Scrum-based. So you have the **standard ceremonies across those teams**. Backlog, grooming, planning sprints, 2- week sprints, sprint reviews, sprint retros. So all the ceremonies. We did try to empower the teams to work completely by themselves. They have a **product manager assigned to the team, developers, and DevOps part of the team.**"*

Former Executive #3, Target

SDLC process maturity



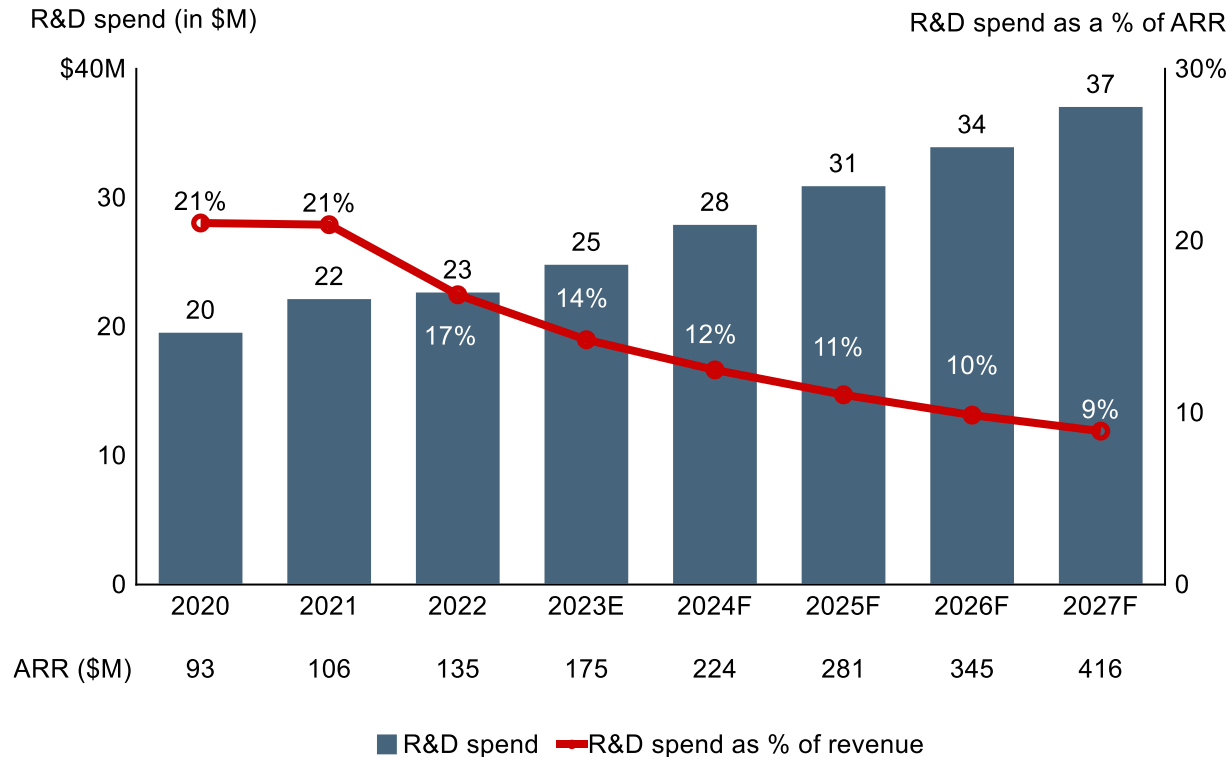
Historically, Target's R&D spend relative to revenue was above healthcare industry competitor benchmarks; management projects spend to drop to 9% of ARR by 2027

R & D TEAM AND PROCESS

R & D SPEND

R&D Spend

Target R&D spend (2020 – 2027F)



R&D spend benchmarks

R&D spend as a % of revenue – Healthcare industry competitor benchmark¹ = 14%

Key takeaways

- Target's **R&D spend as a percent of revenue is currently comparable to that of healthcare industry competitors**, having historically been slightly higher
 - 2022 actual spend as a percent of revenue is slightly higher than the competitor benchmark, whereas 2023 expected is in line with the competitor benchmark
- Management projects R&D spend relative to revenue to decline significantly** and fall well below benchmarked healthcare industry competitors as revenue grows through 2027
- Management claims that this **decline will be due to more efficient development processes** (offshore developers, SDLC optimization) and completion of **large initiatives**, such as initial payments work
- Given that there are still **many large initiatives on Target's roadmap**, new **specialty expansion is not currently budgeted for**, and there are **limits to R&D optimization**, Bain believes the **plans to significantly lower R&D cost relative to revenue are ambitious and unlikely to be fully realized**

Note: ¹ healthcare industry competitor benchmark includes Athenahealth, Cerner, Allscripts, NextGen
Source: Target disclosure; PerformanceEngine

Target has extensive policies and procedures to manage cybersecurity risk; however, its security team lacks a dedicated CISO (1/2)

CYBERSECURITY

HIGH-LEVEL FINDINGS

Assessment



Cybersecurity (1/2)

Section(s)

Assessment

Confidence

Security organization

- There is no dedicated CISO within Target's organization. The Director of Technology Operations oversees application security and the designated resources responsible for managing security for all production systems; the response team is present to review, monitor, and investigate incidents
- Responsibility and accountability for overseeing activities for the development, revision, and maintenance of Target's security, compliance, and operations policies is assigned to Target's Information Security Team, along with several other corporate IT security responsibilities
 - The Information Security Team is small with only 1 Security Engineer and 1 Security Analyst. Combined responsibilities include vulnerability management, penetration testing, design / implementation / configuration of security infrastructure (e.g., firewalls, intrusion detection/prevention systems, etc.), incident response and management, implementation and maintenance of security policy and standards, and development and maintenance of security awareness training
- Target's security organization has 2 branches; the Application Security Team and the Information Security Team, totaling ~5-8 FTEs. The VP of Regulatory and a regulatory team handle aspects of compliance and addressing health information security risks
 - According to census documentation, the two security FTEs within the IT organization were hired in Q2 and Q3 of 2023



Governance and risk management

- Management has defined formal risk assessment policies and procedures specifying the process for identifying internal and external threats and vulnerabilities, evaluating and addressing risks, and defining risk tolerances
 - The risk assessment process involves identifying critical information assets, prioritizing them, assessing threats and vulnerabilities, determining the likelihood of risks, addressing the risks, and identifying vulnerabilities associated with each identified risk
- Policies, standards, and procedures are reviewed and approved at least annually, by Director or VP-level personnel for policies and by Managers for standards and procedures within their responsible areas of control. All policies, standards, and procedures are also approved by the Information Security team
- Monthly security committee meetings that include senior management participation are held to discuss internal control assessments, incidents, deficiencies, and to ensure corrective action is taken



Policies and procedures

- The company has implemented a comprehensive set of policies and procedures to ensure system security and data protection
 - Policies and procedures addressing information security, health information security, data protection, authentication/access, compliance, training, risk/incident assessment and management, organizational and information security, encryption, 3rd-party vendors, etc. are comprehensively documented
 - Management has policies and procedures in place that outline the responsibilities and accountability for system security with major changes to systems or operational processes subject to a security risk assessment
- The organization documents all policies and procedures. These documents are made available to employees and are communicated to internal users through the company intranet. Additionally, an information classification policy defines information categories, protection levels, and appropriate measures for handling information utilized by the system



Source: Target disclosure

Target has appropriate systems in place to protect data, maintain compliance, and prevent breaches and incursions (1/2)

CYBERSECURITY

HIGH-LEVEL FINDINGS

Assessment

Negative



Positive

Cybersecurity (2/2)

Section(s)

Assessment

Confidence

Certifications and compliance

- Target is compliant with the security and privacy requirements of HIPAA along with the local laws of the jurisdictions in which it operates. Moreover, it designs systems in compliance with regulatory requirements
 - Target annually engages with A-LIGN, a compliance auditing organization, for a SOC2 assessment. The 2023 report included a HIPAA (Health Insurance Portability and Accountability Act) and HITECH (Health Information Technology for Economic and Clinical Health) compliance assessment
 - In 2020 'HIPAA Secure Now!' performed an administrative, physical, and technical assessment of Target against the HIPAA security regulation. 4 medium and 23 low risks were identified and Target created a detailed plan for remediation. *Further diligence required to understand remediation plan execution*
- Target has developed a Health Information Security Management program to meet the information security and compliance requirements related to EMR and PM services. The program incorporates the elements of HIPAA and HITECH
- The company undergoes compliance audits at least annually to demonstrate compliance to relevant laws, regulations, and standards
- Target integrates with a 3rd-party, Imperva, to provide PCI compliance to customers for a monthly charge
 - Target does not require PCI compliance because processing and storage of cardholder data is entirely outsourced to a PCI DSS validated 3rd-party (Stripe)



Breaches, incursions, and data exfiltration

- Appropriate incident detection and response measures are in place in the event of a breach, incursion, or exfiltration
 - Target employs an Intrusion Detection System (IDS) to scrutinize network activities, subsequently identifying and alerting about potential or confirmed security incursions within the network
 - Target's production systems are configured to log access-related events, which are assessed weekly by cloud service personnel, and security monitoring tools analyze network events and notify information security staff via email about potential or confirmed security breaches
 - The internal cloud infrastructure team leverages LogicMonitor and Azure tools to provide centralized monitoring of the platform; alerts are generated as system threshold limits and potential security threats are detected
 - Target has a documented security incident response plan, which includes breach notification requirements as mandated by HITECH
- There have been no successful material data breaches or data exfiltration from the Target platform over the past 3 years
- Target has cybersecurity insurance to protect itself in the event of a breach with a combined policy aggregate limit of \$5M



Data protection

- Target encrypts production and other critical data on backup media, employing software that supports the AES-256 standard. Data is encrypted in transit and at rest (DB-level)
- The company complies with Fair Credit Reporting Act (FCRA) regulations by anonymizing PII. Moreover, customer data, including PHI and PII, is considered confidential and subject to Target's Information Classification, Data Retention, and Disposal policies
- Physical and logical separation, as well as access controls secure receipt, storage, and internal transfer of data w/in system boundaries
- Target has implemented backup and recovery processes to ensure the protection and recovery of its environment and data. It utilizes an automated backup tool to perform regular backups of production data and systems according to scheduled intervals. Backups are replicated in real time to another Azure cloud data center, and annual tests are conducted to validate the effectiveness of restoration



Source: Target disclosure

AGENDA

Product and Roadmap

Organization & Processes

Technology & Architecture

Tech Architecture

Tech Stack

Hosting

Code Inventory

API Analysis

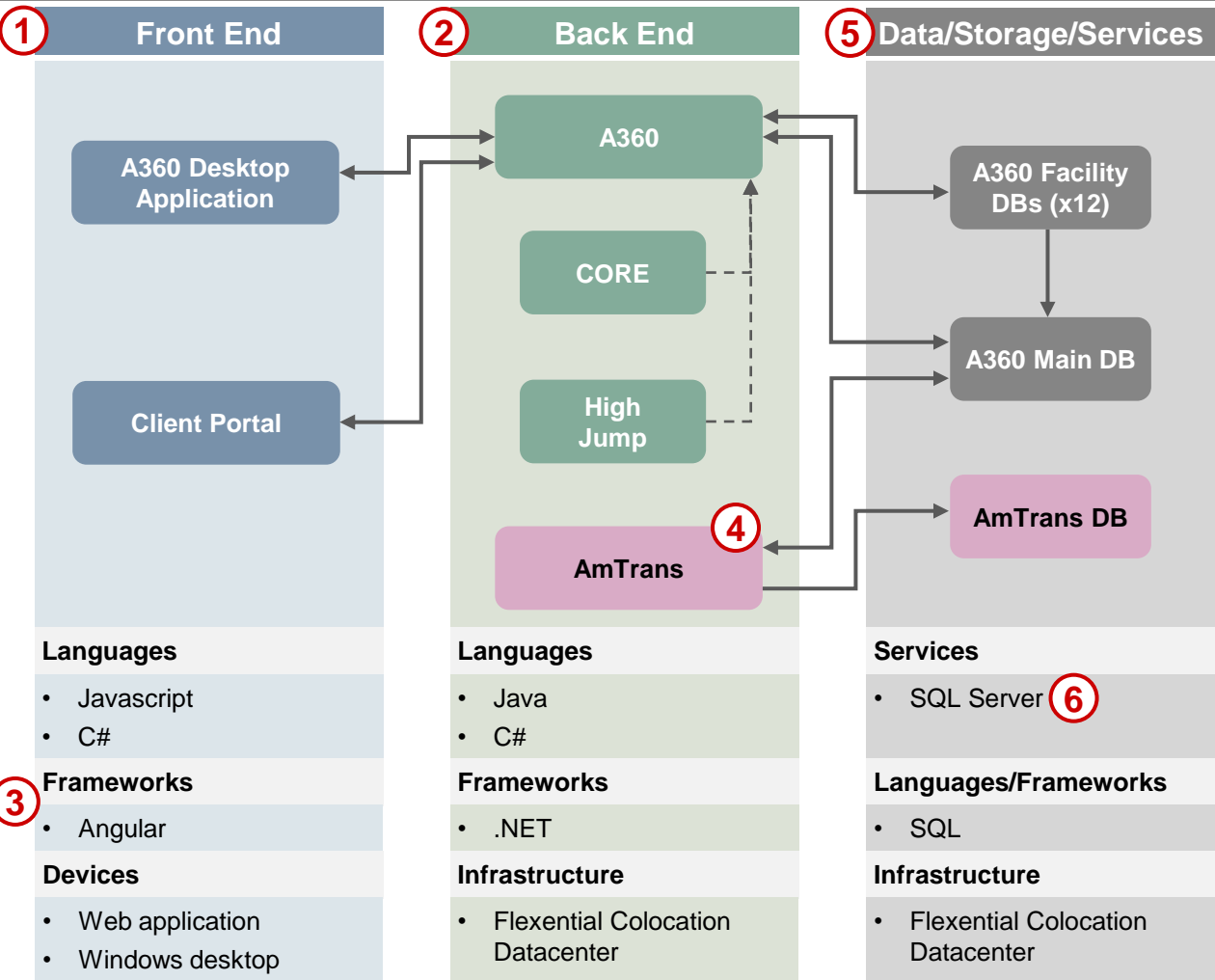
- Ⓐ Target has multiple applications in each architecture layer without proper integration;
- Ⓑ Different frameworks, versions, and languages are used across modules

TARGET

TECH ARCHITECTURE

Tech Architecture

Architecture diagram and tech stack



Source: RSM - Project Pace IT and Cyber DD reports

Key takeaways

- 1 For order-related tasks such as viewing status, submitting orders, and creating new SKUs, customers use A360, and for accessing invoices, they use AmTrans. Due to insufficient information, Bain cannot evaluate the technology and architecture of such portals that are directly facing the clients
- 2 Target is managing their warehouse operations utilizing the A360, CORE, and High Jump WMSs. Management was aiming to move all High Jump accounts to A360 by Jan'23 and all CORE accounts by the end of 2023. At the time of diligence meetings, A8 confirmed the timelines have been extended
- 3 A360 and ShipTrak are desktop applications built on a .NET architecture, and their internal user Middleware application is web-based. However, the variety of .NET versions potentially adds to the technical debt leading to security risks and maintainability concerns
- 4 AmTrans, being a third-party app, poses operational risks as Target lacks ownership or the ability to make changes, and connects directly to A360 production database, which may require future maintenance work
- 5 For each warehouse, A360 operations depend on their own transactional database, with batch updates being sent to a central consolidated database. However, the organization is moving towards a consolidated database strategy, which is expected to streamline data flow and minimize technical debt.
- 6 For data management, Target relies on MS SQL 2008 (which reached end of life in 2019), exposing the company to extended outages and security risks

Legend --- -> To-be phased out and migrated to A360 in 2023 WMS platforms Third-party application

Target Y leverages older, well-established tech such as the C++ MFC framework; which may present a maintainability risk



















TECHNOLOGY & ARCHITECTURE		TECHNOLOGY STACK		Tech Stack
Application	Description	Assessment		
<div><div></div><div>Frontend Technologies</div></div> <div><div></div></div>	<ul style="list-style-type: none">C++ is an older, but well established and maintainable, programming languageWhile still used for certain UI applications where speed of execution is important, it is an older frontend choice for this type of applicationTarget Y is using BCGSoft to refresh the UI of its desktop tools; BCGSoft is a UI wrapper that can be used on top of C++ MFC applications, such as Versasec's CMSWhile BCGSoft may provide a somewhat more modern UX, the UI will still appear relatively dated compared to industry standards		<div>- [] [] [] [] +</div> <div>TBD by Case Team</div> <div>Target Y uses well established technologies, which presents an immediate maintainability risk; however, the age of these technologies results in a more dated UI/UX, which compares poorly with modern interfaces</div>	
<div><div></div><div>Backend Technologies</div></div> <div><div></div></div>	<ul style="list-style-type: none">C++ is an older, but well established and maintainable, general-purpose programming language; sourcing C++ developers in the next 5+ years may become increasingly challengingTarget Y leverages the .NET framework. The company plans to migrate to .NET Core, which is the most modern iteration of the frameworkNewer modules with business logic have been written in C#, a very widely adopted programming language for developing .NET applications			
<div><div></div><div>Database Technologies</div></div> <div><div></div></div>	<ul style="list-style-type: none">Target Y is provided with SQLite, a fast and simple database, as the default internal databaseTarget Y also supports MariaDB, MySQL and MS SQL as external databases; these are relatively older but well established databases that do not present maintainability risks			
			Assessment	Negative Positive

[Target] leverage a modern and diverse tech stack with a close integration between its five main programming languages and key frameworks

TECHNOLOGY & ARCHITECTURE

TECHNOLOGY STACK

Tech Stack

Application	Technology Stack	Comments
 Programming Languages	   Objective-C  TS 	<ul style="list-style-type: none">• Kotlin, Swift and Objective-C are the native programming languages to develop applications for Android and iOS.• TypeScript is a popular type-safe superset of JavaScript well suited for web development.• Ruby is a general-purpose language, often used for web developments and is known as one of the most time-efficient languages to develop in.
 Frameworks	   	<ul style="list-style-type: none">• Rails, also known as Ruby on Rails, is a server-side Web App framework and is known for its high standard of safety.• Angular is a TypeScript based Web App Framework for building single-page client applications.• NodeJS is a open-source JavaScript run-time environment to develop back-end services.• Sidekiq is an open source job scheduler and background processing framework for Ruby.
 Database & Data Stores	  redis 	<ul style="list-style-type: none">• Amazon Aurora is a high-performing and highly scalable relational database engine that supports MySQL and PostgreSQL.• Redis is a popular open-source in-memory key-value data store.• Memcached is a high-performance, in-memory data store with very fast response times, making it ideal as a cache or as a session management solution.
 Web Server	 	<ul style="list-style-type: none">• Puma is a web server for Ruby applications with a focus on parallelism, speed, and efficient use of memory.• Docker is a leading containerization technology.

TBD by Case Team

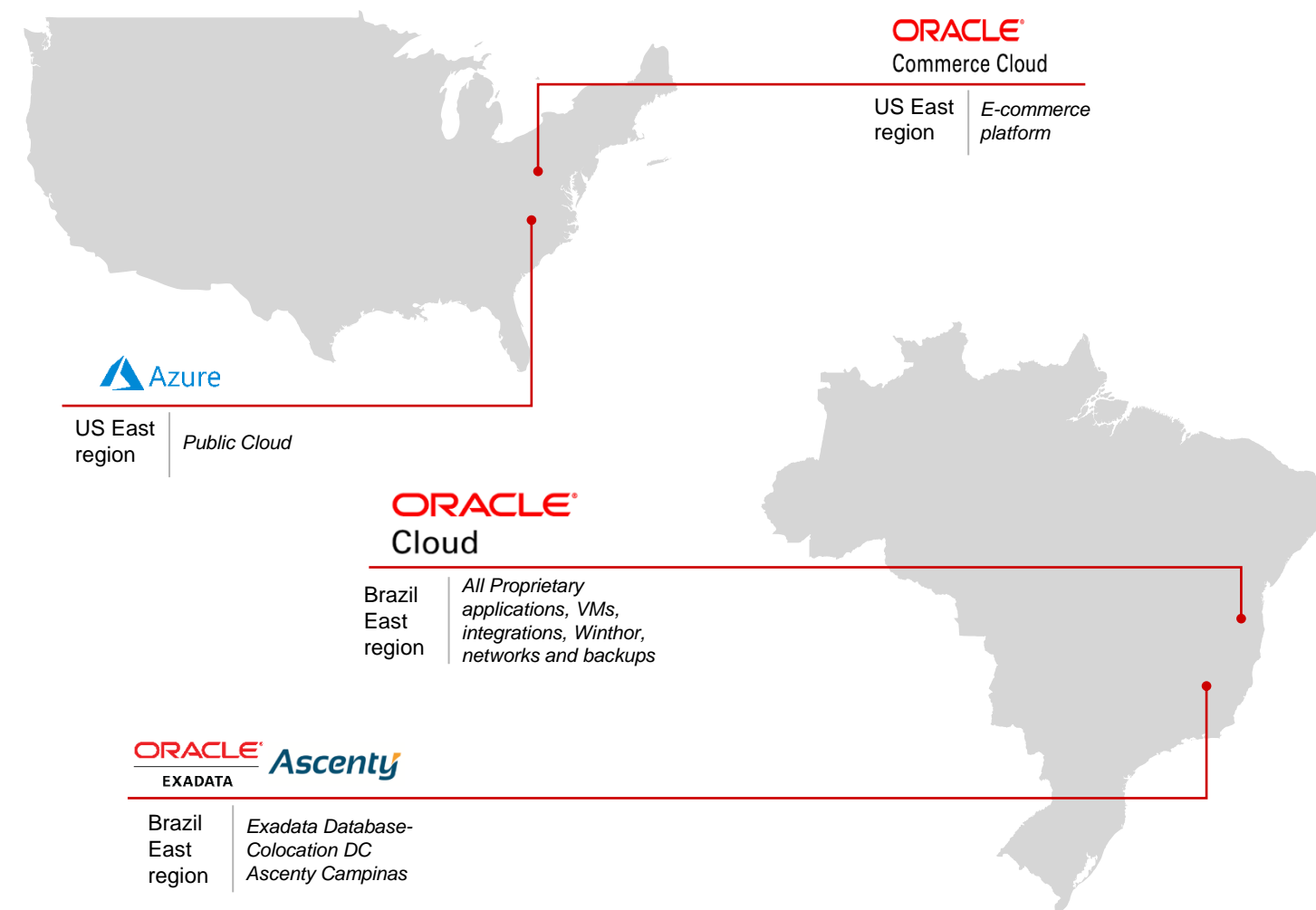
Reach utilizes Oracle and Azure cloud infrastructure located both in US and Brazil; hosting is not optimized leading to outages

TECHNOLOGY & ARCHITECTURE

HOSTING

Hosting

Database regions



Source: Project Reach (VDR); Bain Analysis

Key takeaways



Infrastructure management and administration

- Main OCI Hosting is through **Oracle public cloud** serving in east Brazil and Oracle Commerce Cloud in east US
- Services are distributed through **Oracle Exadata and Ascenty** in east Brazil and **Azure public cloud** in US
- Local hardware is distributed on Reach's sites through user backup and data sharing Datalake and AI/ML applications
- Hosting for Reach is not optimized and fragmented causing issues such as link outages, unhealthy database cache and excessive load on service
 - For link outage, Reach's plans to hire a separate fast connect. But for other outages, it lacks a remediation plan



Backups

- All corporate data is backed up in OCI using **Oracle's gold backup** and retention policy
- Production database operates **with two active nodes** - the second node is always on stand-by with near real time data replication (dataguard) in case of logical failure
- Local fileservers are replicated to OCI **on a daily basis** following the backup and retention policy



Availability

- All of Reach's physical sites (warehouses, offices and crossdocking locations) are equipped with two dedicated internet links being 2 BLD for smaller offices and locations and 1 MPLS (connected directly to OCI) and 1 BLD for warehouses and central offices

[Target] has [] open-source software components. A static code analysis conducted identified [] strong copyleft and [] weak copyleft components

CAST ASSESSMENT

OSS

Code Inventory

CAST Analysis

Risk	License	# of Components
High (Strong Copyleft)	GNU General Public License v2.0	[XX]
	GNU General Public License v3.0	
	Ruby* License	
	GNU General Public Licenses Family	
	GNU Lesser General Public License v3.0	
Medium (Weak Copyleft)	Mozilla Public License 2.0	[XX]
	Creative Commons Zero v1.0 Universal	
	Creative Commons Attribution 3.0 Unported	
	Artistic License 2.0	
Low (Permissive)	MIT License	[XXXX]
	Apache License	
	Other	
Unclassified		[XX]

Bain & Company Analysis and Adjustments

Risk	License	# of Components
High (Strong Copyleft)	GNU General Public License v2.0	[XX]of which one component is potentially distributed
	GNU General Public License v3.0	
	Ruby* License (medium)	
	GNU General Public Licenses Family	
	GNU Lesser General Public License v3.0 (medium)	
Medium (Weak Copyleft)	Mozilla Public License 2.0	[XX]
	Creative Commons Zero v1.0 Universal	
	Creative Commons Attribution 3.0 Unported	
	Artistic License 2.0	
Low (Permissive)	MIT License	[XXXX]
	Apache License	
	Other	
Unclassified		[XX]



We have identified one component with significant Copyleft risk ([component]) that arises from potential distribution
Consultation with legal advisors is strongly recommended on all open-source risks

Note: CAST has flagged these Ruby licenses has high compliance risks. However, it is likely that their actual level of risk is lower.

Neptune API breadth | While Neptune offers fewer APIs compared to leading competitors, its services cater to local payments businesses

UAE PLATFORM

ORCHESTRATION

Volume of APIs:



API Assessment

API offering comparison (# of APIs)

		Neptune	stripe	MARQETA	fiserv.
Acquiring	Core processing functions (e.g., data encryption & tokenization, transaction authentication & authorization, fraud mgmt.)	(5)	(36)	(38)	(17)
	Payment interfaces (e.g., stationary POS/ terminals, online/ hosted webpages, assisted payments by link)	(5)	(42)	(4)	(16)
	Payment method (e.g., acquiring methods and sources)	(0)	(13)	(0)	(8)
	Program mgmt. functions (e.g., merchant onboarding, merchant billing, POS terminal mgmt.)	(4)	(40)	(8)	(2)
	Value-added services (e.g., merchant lending / cash advance program, client-facing rewards & loyalty program)	(0)	(40)	(0)	(1)
Issuing	Core processing functions (e.g., PIN mgmt., real-time notification, credit decisioning, etc.)	(28)	(55)	(25)	(92)
	Payment method (e.g., prepaid cards)	(2)	(0)	(0)	(1)
	Program mgmt. functions (e.g., card issuance lifecycle mgmt., dispute & chargeback mgmt., cardholder self-service portal)	(7)	(28)	(26)	(89)
	Value-added services (e.g., BNPL, instant card issuance, virtual cards, advanced fraud & risk management)	(26)	(9)	(19)	(118)
Common functionality	Payment method (e.g., debit/ credit cards)	(0)	(16)	(0)	(0)
	Program mgmt. functions (e.g., statement generation & distribution)	(1)	(2)	(2)	(0)
	Stakeholder management (e.g., user account mgmt.)	(17)	(94)	(25)	(0)
	Reporting and analytics (e.g., customer reports, card data analytics, transaction reports)	(4)	(26)	(149)	(0)
Other	Other (e.g., insurance mgmt., shipping rate mgmt., scheduled queries)	(7)	(23)	(31)	(16)
TOTAL		106	424	327	360

Comments

- Neptune offers **17 APIs around BNPL services** (VAS) such as transaction refinancing, balance transfer, balance conversion etc. where **BNPL functionality is provided by KSA-based Tabby**
- Neptune's **payment interface APIs** include unique cash withdrawal, cash withdrawal reversal, purchase, and purchase reversal services performed at **physical POS terminals**
- **Stripe has the widest API coverage** across all regions, providing extensive services compared to peers around remote terminal management (32), issuing and acquiring program management (68), and user account management (94)
- **Marqeta leads the peer set in reporting and analytics services** (149), offering a separate RESTful interface branded DiVA (Data insights, Visualization, and Analytics), which provides customers programmatic access to production data from their card programs

Note: 1) APIs pertaining to objects, webhooks, or those in beta version have been excluded from the analysis; 2) The assessment color gradient is based on the following five API thresholds: 0, 1-10, 11-20, 21-30, and >30
Source: Company websites, secondary research, Bain analysis

