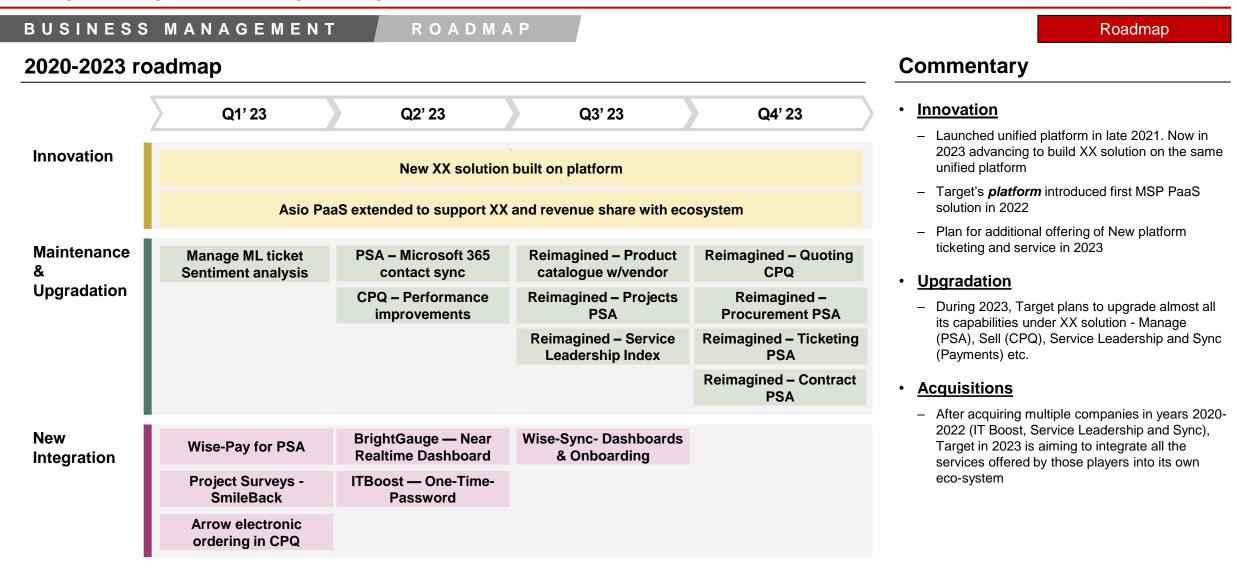
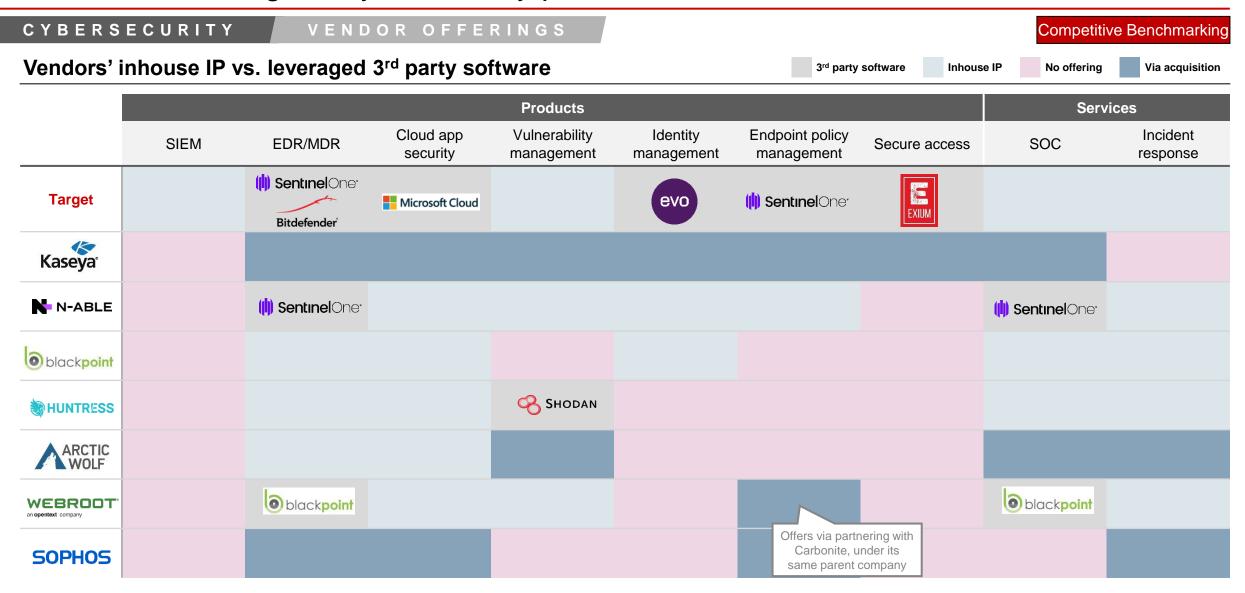
Target aims to strengthen its platform by building new XX solution along with upgrading and integrating multiple capabilities in 2023

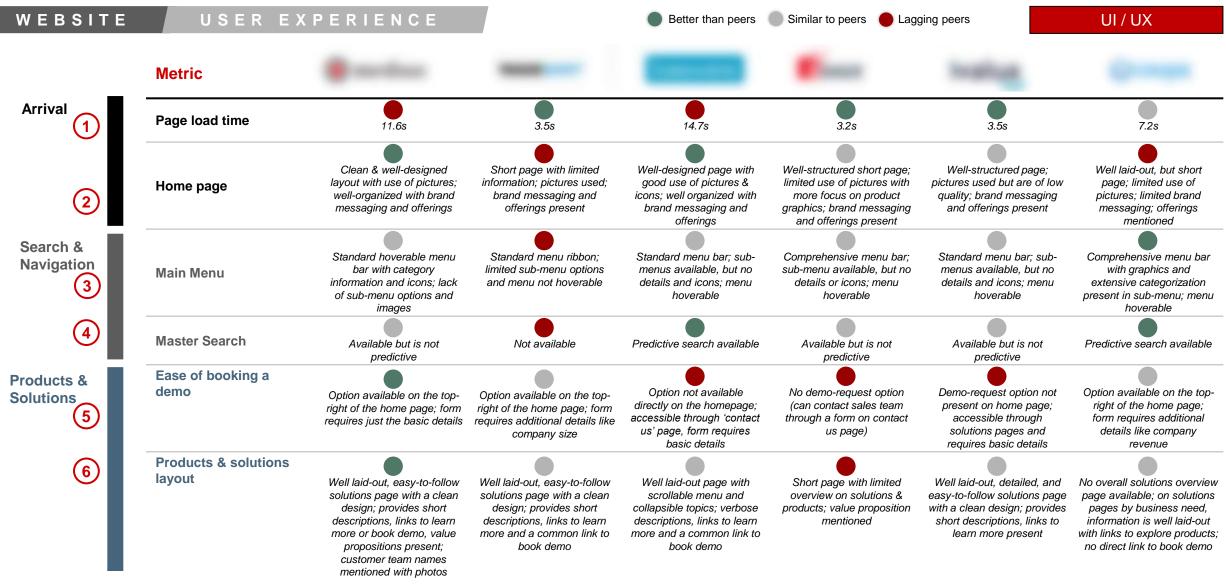


Unlike most of its peers, Target has formed partnerships with third-party vendors across broad range of cybersecurity products and services



Source: Project Target; Bain Analysis

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



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

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

Tech ops (14)

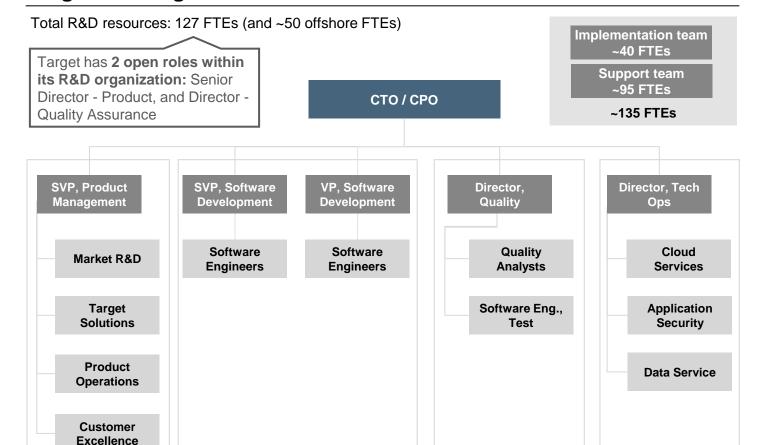
R&D TEAM AND PROCESS

ORGANIZATION CHART

Quality assurance (18)

Organization Chart

Target R&D organization



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

Product mgmt. (30)

Key takeaways

- Target's technology organization consists of crossfunctional 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

"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

Software development (65)

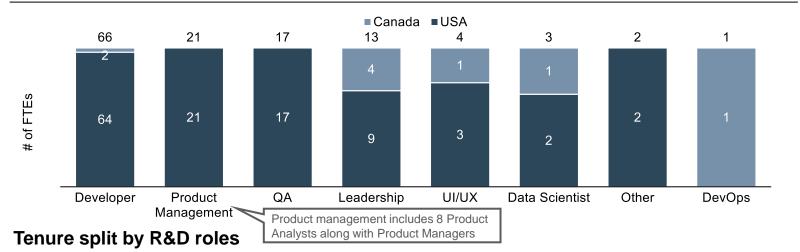
Internal team: A majority of Target's R&D organization is based in the US (93%), with recent hiring in Canada (~7% of headcount)

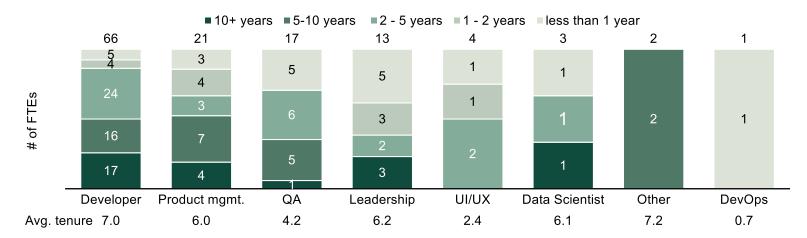
R&D TEAM AND PROCESS

GEOGRAPHY AND TENURE SPLIT

R&D-Tenure & Geography

Geography split by R&D roles





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

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

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

R&D TEAM AND PROCESS

SDLC

Assessment: Negative

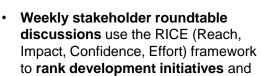
SDLC

Maintenance and

monitoring



Business planning



· High priority items are further elaborated in workstream management tools (Jira) to include functional acceptance criteria and testing requirements

prioritize backlog items

Quarterly roundtable meetings involving R&D and product leadership are held to discuss roadmap priorities





Development



(daily stand-up meetings, retrospectives, planning sessions) Code peer review and product

sprints and agile ceremonies

- manager signoff verify adherence to the predefined functional criteria
- Maintenance items are incorporated into sprints









Testing and quality assurance

- Developer-written automated test suites and static code scans are run and enforced in development tooling (i.e., GitHub, Azure DevOps)
- Functional test code converge varies by product. Average coverage is 75-80% which reduces the need for manual testing, and is in line with industry standards
- Load testing is performed using JMeter up to 3-5x current demand





→·→·→ Deployment

- Target uses automated service-based deployment in Azure via Azure DevOps
- Typically, **deployments** are released to production every 2 weeks
- · Manual release gates include sign off by development/QA and approval by R&D/ product leadership
- · Features can be toggled on/off (using LaunchDarkly)

LaunchDarkly \Rightarrow



If critical defects are found after release, Target has a "fix forward" strategy to fix defects quickly instead of rolling back the entire release

- Defect KPIs are tracked to identify root causes of issues
- The environment is monitored using tools such as Azure Monitor, Logic Monitor, SQL Sentry, and Azure Application Insights









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."

Zephyr

Project

Former Executive #3, Target

SDLC process maturity



Source: Target VDD deck; Market participant interviews

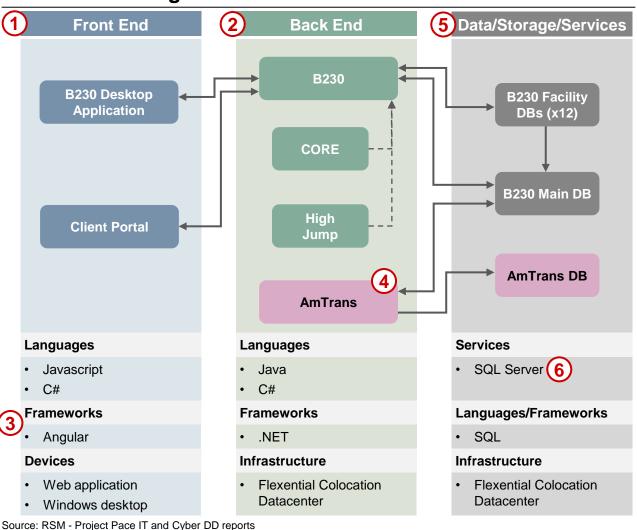
Target has multiple applications in each architecture layer without proper integration;
Different frameworks, versions, and languages are used across modules

TARGET

TECH ARCHITECTURE

Tech Architecture

Architecture diagram and tech stack



Key takeaways

- For order-related tasks such as viewing status, submitting orders, and creating new SKUs, customers use B230, 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
- Target is managing their warehouse operations utilizing the B230, CORE, and High Jump WMSs. Management was aiming to move all High Jump accounts to B230 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 B230 and STrak 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 B230 production database, which may require future maintenance work
- For each warehouse, B230 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



Target 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 • C++ is an older, but well established and maintainable, programming **BCG**Soft language • While still used for certain UI applications where speed of execution is important, it is an older frontend choice for this type of application Frontend Target is using BCGSoft to refresh the UI of its desktop tools; BCGSoft **Technologies** is a UI wrapper that can be used on top of C++ MFC applications, such as Versasec's CMS While BCGSoft may provide a somewhat more modern UX, the UI will still appear relatively dated compared to industry standards • C++ is an older, but well established and maintainable, general-Target uses well established purpose programming language; sourcing C++ developers in the next technologies that do not present an 5+ years may become increasingly challenging immediate maintainability risk; **Backend** • Target leverages the .NET framework. The company plans to migrate however, the age of these .NET **Technologies** to .NET Core, which is the most modern iteration of the framework technologies results in a more Newer modules with business logic have been written in C#, a very dated UI/UX, which compares widely adopted programming language for developing .NET poorly with modern interfaces applications Target is provided with SQLite, a fast and simple database, as the



Database Technologies







- Target is provided with SQLite, a fast and simple database, as the default internal database
- Target 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





