AD52

Leading & Coaching Teams

4:30 PM

AD52 - What Japanese Shinkansen Trains Can Teach Us about Agile

Presented by:

Matthew Weinstock

Align Technology

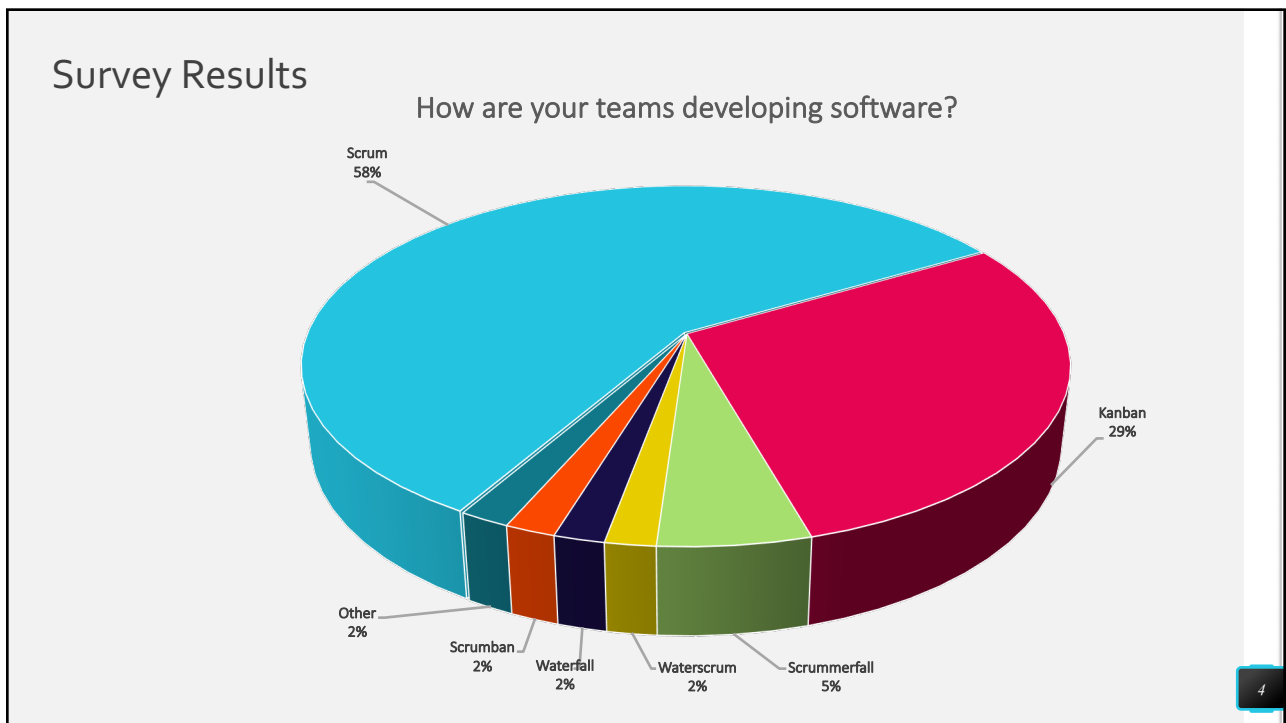**Brought to you by:**

TECHWELL™

Matthew Weinstock

Matthew Weinstock is the director of Global SQA at Align Technology. A developer turned tester, Matt has held various roles in his SQA career, from manual tester to automation engineer to leading global quality teams in large public enterprises, and everything in between. Matt has always been passionate about agile and organizational transformations, never forgetting that people are the keystone to every company's success. Matt is proud to be a mentor and coach, encouraging an agile mindset and building trust throughout his organizations. With this people-centric approach to leadership, he has been able to create opportunities for change within organizations that unleash their true potential. Matt lives in Raleigh, North Carolina, and enjoys spending time with his family, traveling the world, and hiking the great outdoors.
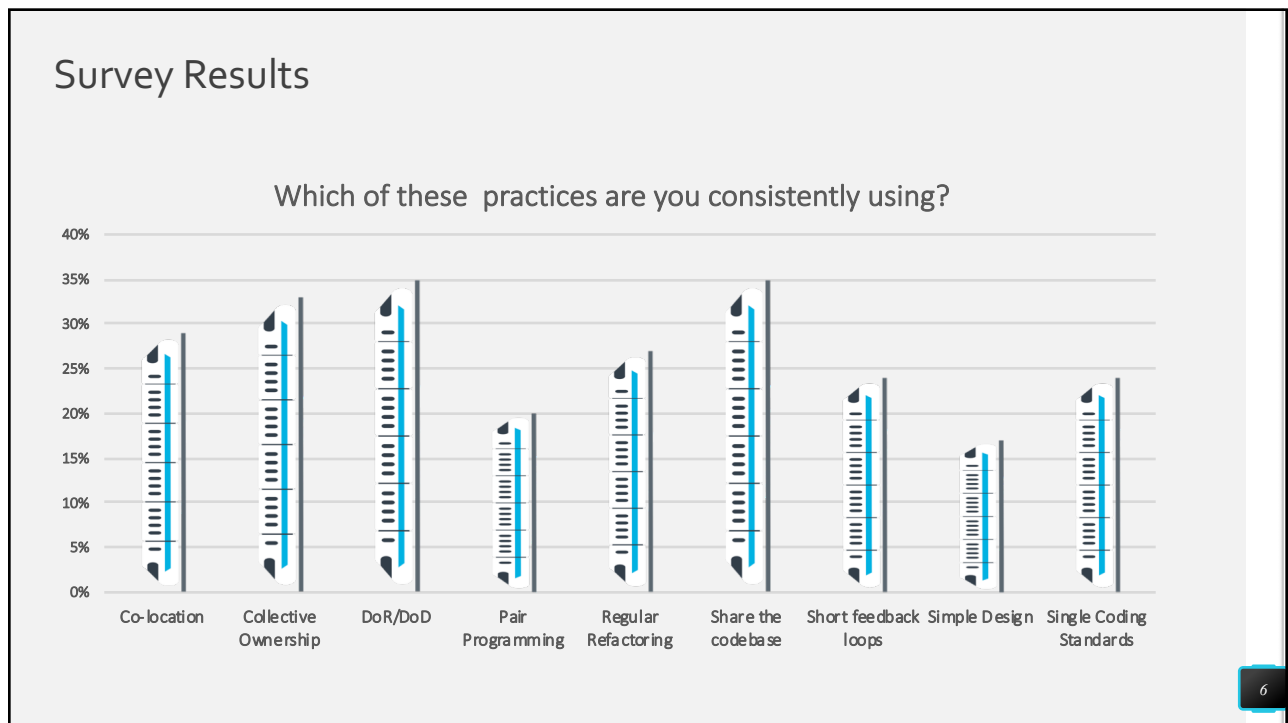
What
Shinkansen
Trains Can Teach
Us About Agile

photo by hans-johnson

Matthew Weinstock

Director of Global SQA
Align Technology

Photo by Max Pixel

It's Survey Time!

menti.com

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Survey Results

How are your teams developing software?

Scrum
58%

Kanban
29%

Other
2%

Scrumban
2%

Waterfall
2%

Waterscrum
2%

Scrummerfall
5%

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ATDD/BDD/TDD	Automation	Backlog refinement
Co-location	Code reviews	Collective ownership
Continuous integration	Demos	DoR/DoD
Pair Programming	Planning	Regular refactoring
Retrospective	Sharing the codebase	Short feedback loops
Simple design	Single coding standards	Standups
	Sprint reviews	

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Survey Results

Which of these practices are you consistently using?

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Survey Results

If the team can't meet timelines, which practices are the first to go?
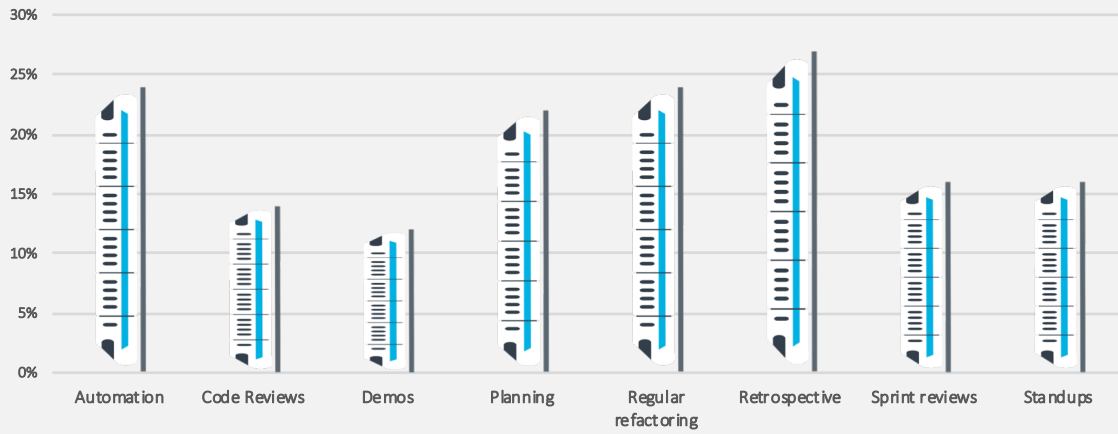
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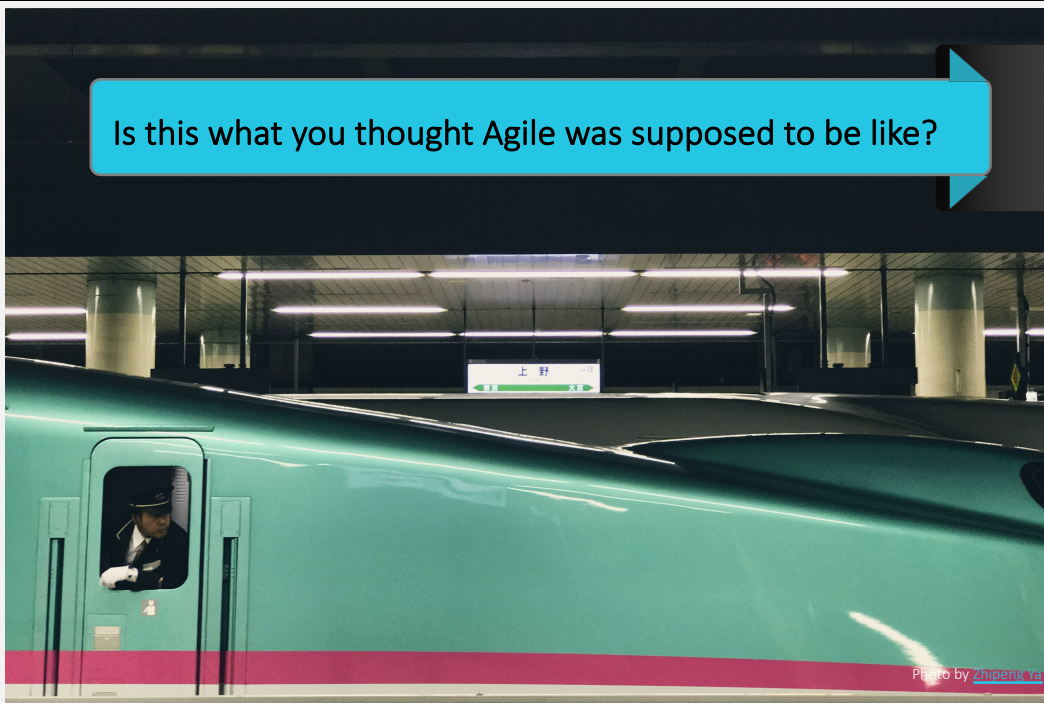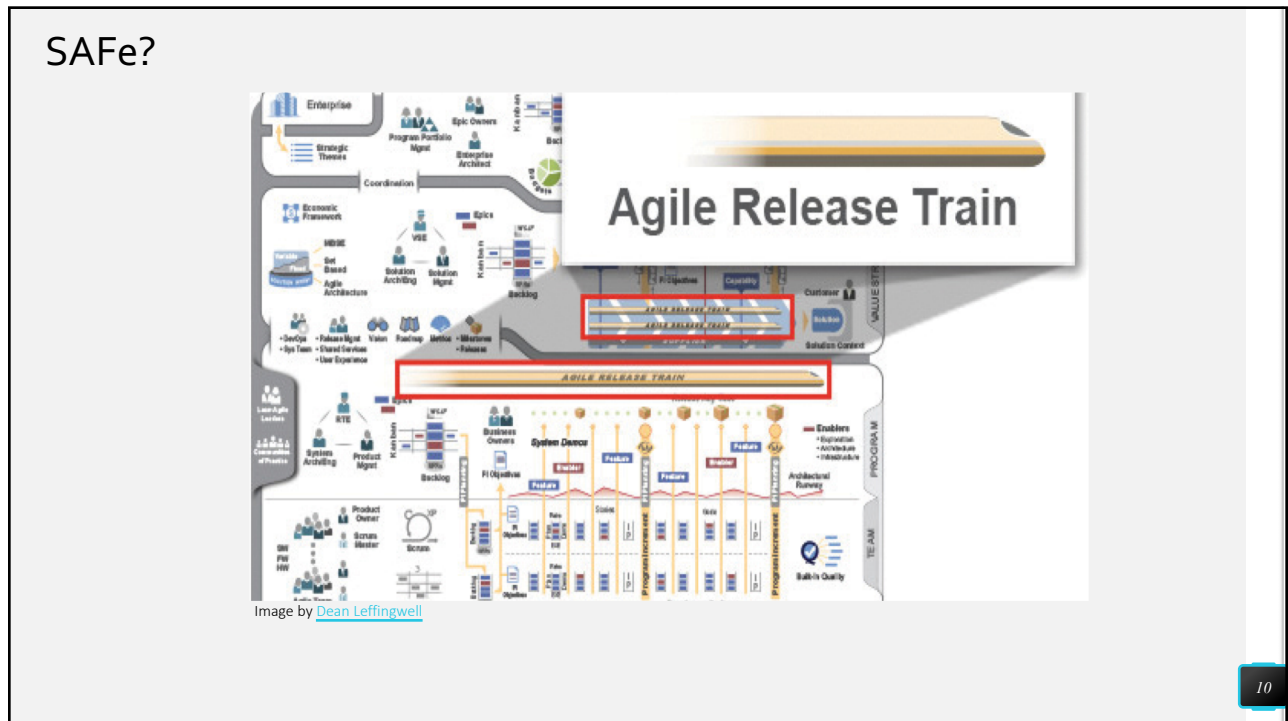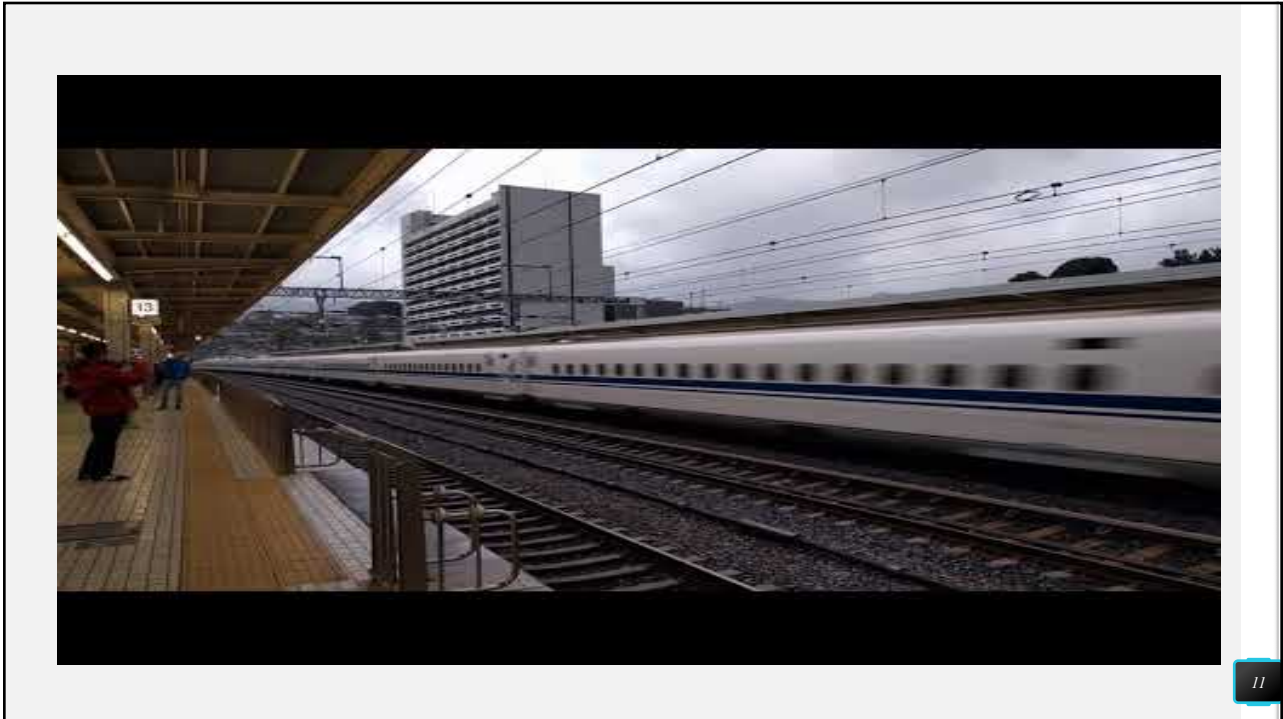

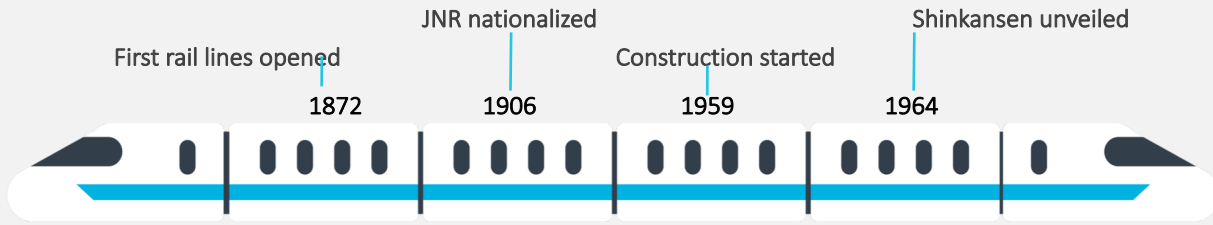
Is this what you thought Agile was supposed to be like?

Photo by zhipeng ya

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So what do Shinkansen trains have to do with Agile anyways?

Photo by RSA

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SAFe?

Agile Release Train

Image by Dean Leffingwell

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How did the Shinkansen and Japanese Railways get here?

History

JNR nationalized

Shinkansen unveiled

First rail lines opened

Construction started

1872   1906   1959   1964

Accomplishments

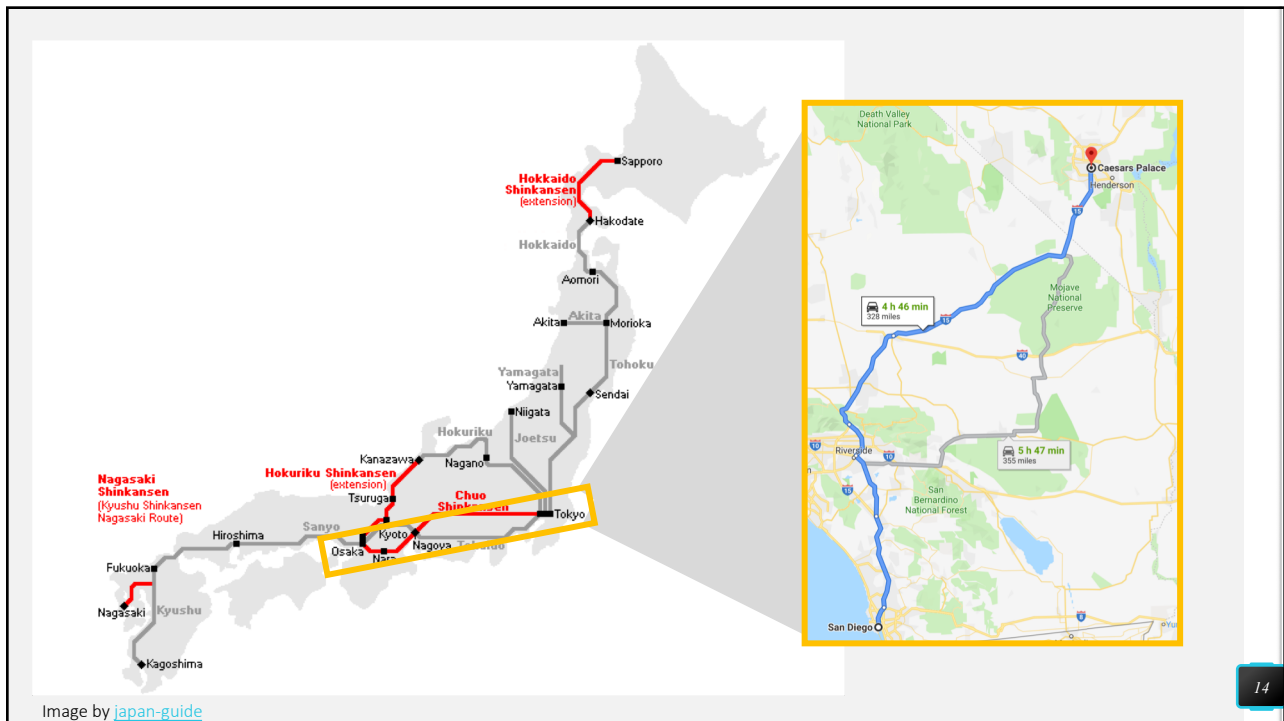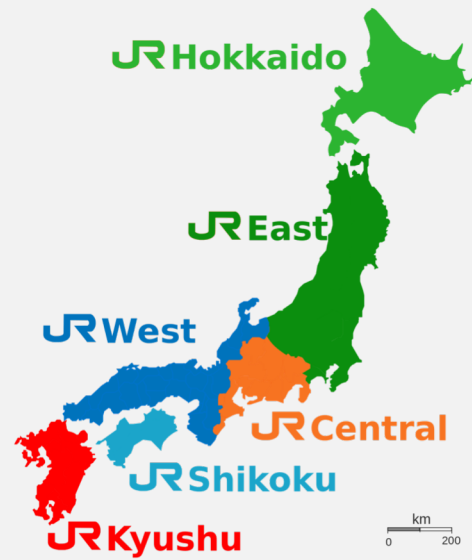|	
Limited express from ~7h - 4h - ~3h	67 miles of new tunnels, 3000 new bridges
2x as fast as any rail	100m passengers in first 3 years

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Image by japan-guide

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JR at scale

1987 JNR was privatized and formed 9 new companies

Today:
- 6 companies, 9 lines
- Million passengers a day
- Trains leave Tokyo every 3m
- Next generation - 375 mph (603 k/hr)!
- 0 fatalities

What has made the Shinkansen and Japanese rail continuously successful?

Short Feedback Loops

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Short Feedback Loops

Fastech 360

Experimental trains to trial new technology
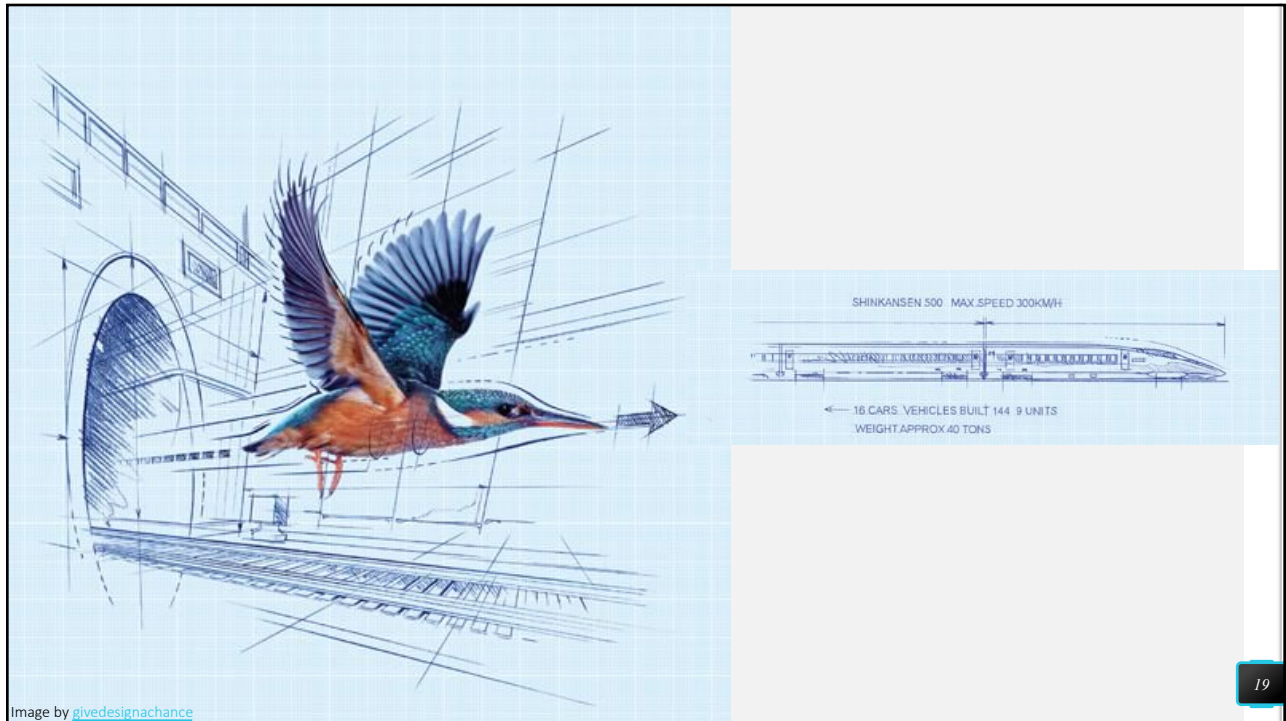
Test trains created tunnel boom at 360 km/h

Emergency air braking plates

Train currently operates on the Tohoku Shinkansen

photo by popular science

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Image by givedesignachance

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Short Feedback Loops

Learn fast with small cost	Don't forget about testing!
Get involved early!	Use production for further feedback
Events are important!	Canarying or A/B Testing

Review - Test - Build - Design - Plan

Sprint 1

Review - Test - Build - Design - Plan

Sprint 2

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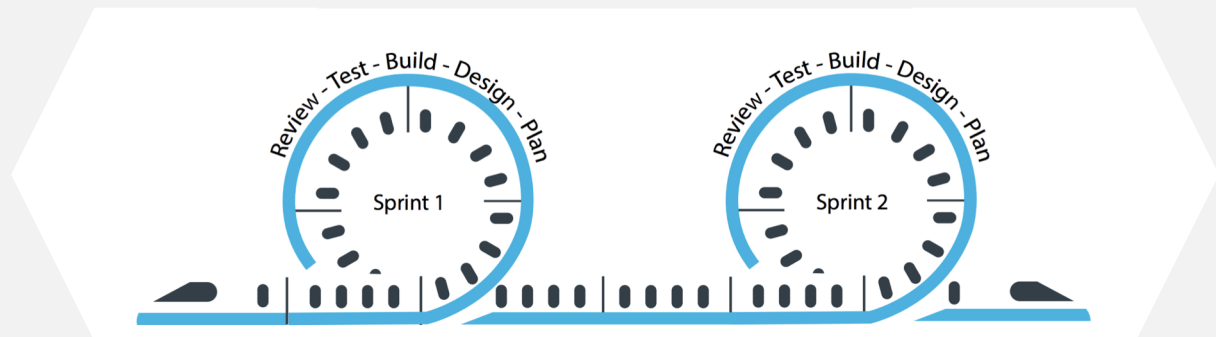
Customer Driven Development

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Customer Driven Development

Tracks through mountains
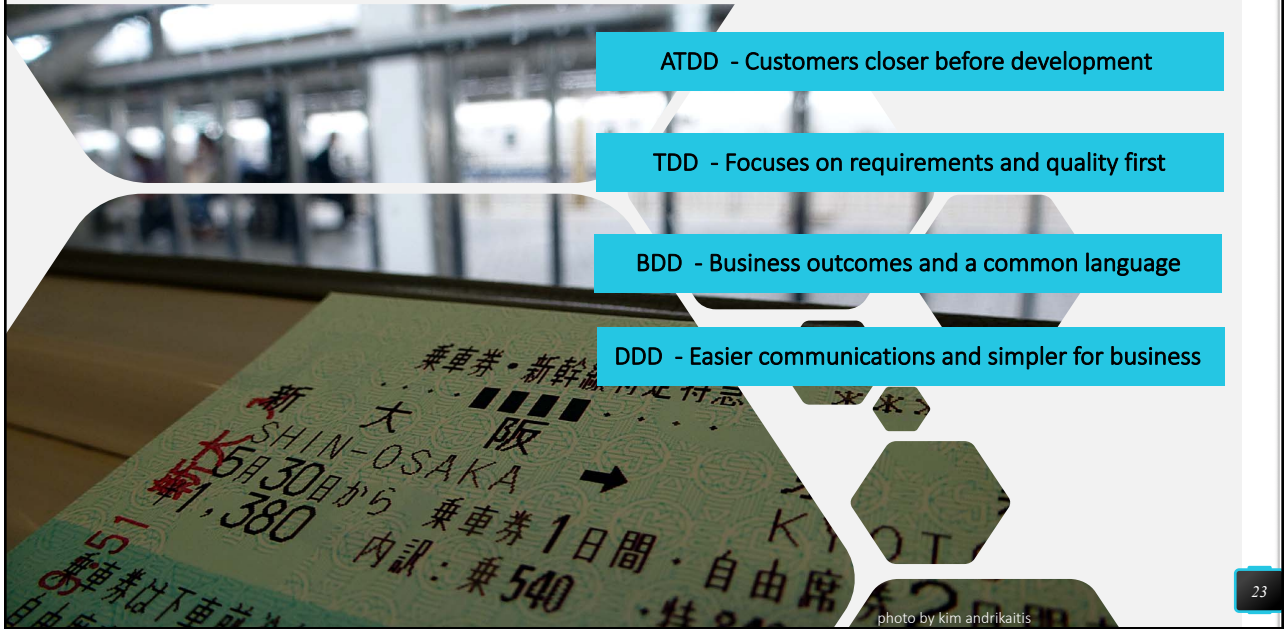
Quieter environment

Passenger comfort at speed

Runs on the subway lines!

Photo by Lover of Romance~commons.wi

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Customer Driven Development

ATDD - Customers closer before development

TDD - Focuses on requirements and quality first

BDD - Business outcomes and a common language

DDD - Easier communications and simpler for business

photo by kim andrikaitis

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Refactor! Refactor! Refactor!

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"The philosophy has not changed even with the advancement of technology. The brakes and signals have since been digitalized and improved to enable the system to run at higher speeds. **As the basic philosophy has not changed since its beginning, we are always able to keep up with technological developments**."

- Osamu Onodera

Shinkansen Driver

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Rigorous, regular refactoring

Powering of all the axles

Urgent Earthquake Detection and Alarm System

Stationary Energy Storage System

Mini-Shinkansen

Trains built to last only 15 years

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Photo by Ippukucho

Rigorous, regular refactoring

A learning tool about the code

Code starts to smell fast; refactoring keeps it fresh

Moves to Single Source of Truth, removes dup code

Investment in the future

Helps with scalability
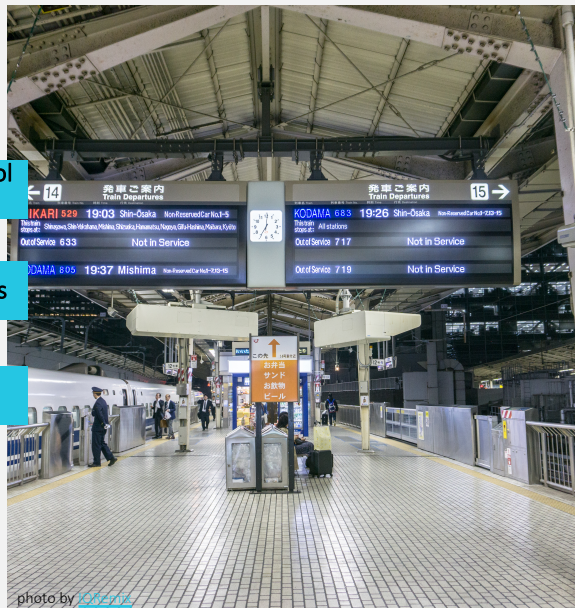
Photo by jpellgen

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Automate All the Things!

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Automated Systems

Autonomous Decentralized Transport Operation Control System (ATOS) for Tokyo center

ATOS directs train drivers through 16x16 lamp matrices

ATC (Automatic Train Control) – no trackside signals

photo by

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"For example, when the inter-vehicle distance from the front train becomes shorter, **the machine automatically performs the actual operations instead of the driver**, such as slowing down and bringing the train to a stop, while also displaying the signals on the monitor at the driver's seat."

- Yoshiyuki Onda

Railway Operations Headquarters at East Japan Railway Company (JR East)

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Automated Systems

Build automation - continuous integration

Eliminates sources of variation - elimination of defects

Test automation should be part of your DoD

Consumer Driven Contracts for integration protecction

Production issue dashboards and automatic notifications

Serious cost reductions

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Single Codebases and Single Coding Standards

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2019/04/27

Single Codebase + Single Coding Standards

The first Shinkansen produced by 6 different manufacturers

Manufacturers cooperating since 1964

In 2007 the reliability of the Shinkansen was 60x higher than French TGV trains

Interoperability between companies even with different technologies and equipment

photo by Sodai Gomi

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Single Codebase + Single Coding Standards

Maintain and extend code

Single source of truth - development and test

Short time to comprehension of code

Need to swarm? No problem!

Encourages responsibility for the quality of the whole

Collective Ownership - Promotes pride and happiness

photo by tokyoform

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Pair Programming

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Pair Programming

First year spent in stations

On the job training lasts between 3 – 5 months

Experienced driver mentors & evaluates performance

Experienced driver recommends further training

If fit to operate, trainees take a test to become a driver

Start with local and regional trains before moving up

Photo from walletgroove.com

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Pair Programming

96% of pair programmers enjoyed their work more than when they programmed alone.
95% were more confident in their solutions when they pair programmed

What does the Pair Programming provide?

Shares best practices

Faster on-boarding

Builds rapport

Harder to Procrastinate

Identify and Reduce Bad Hires

Remote team pairing works too!

photo by Inchicha.jpg

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Safety is our No. 1 Concern

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photo by Allan Richaz

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Calming departure and arrivals

東　京　山区

とうきょう

神田　Kanda　　Tōkyō　　有楽町　Yūrakuchō

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指差喚呼 *shisa kanko*

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Safety

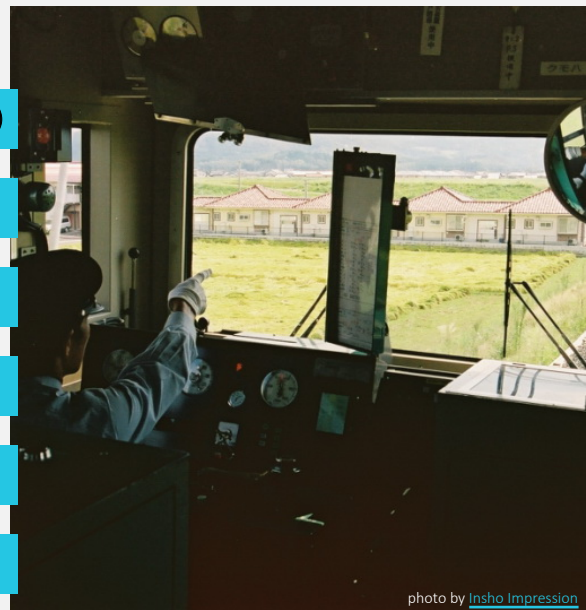5 Scrum values (focus, openness, respect, courage, commitment)

Psychological safety - no one is punished or humiliated

Team members are more confident in safe settings

Build trust in one another

Retro and iterate, no finger pointing on failed sprints

Open and consistent communication

photo by Insho Impression

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Thoughts for your journey home

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Thank You

Matthew Weinstock

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