

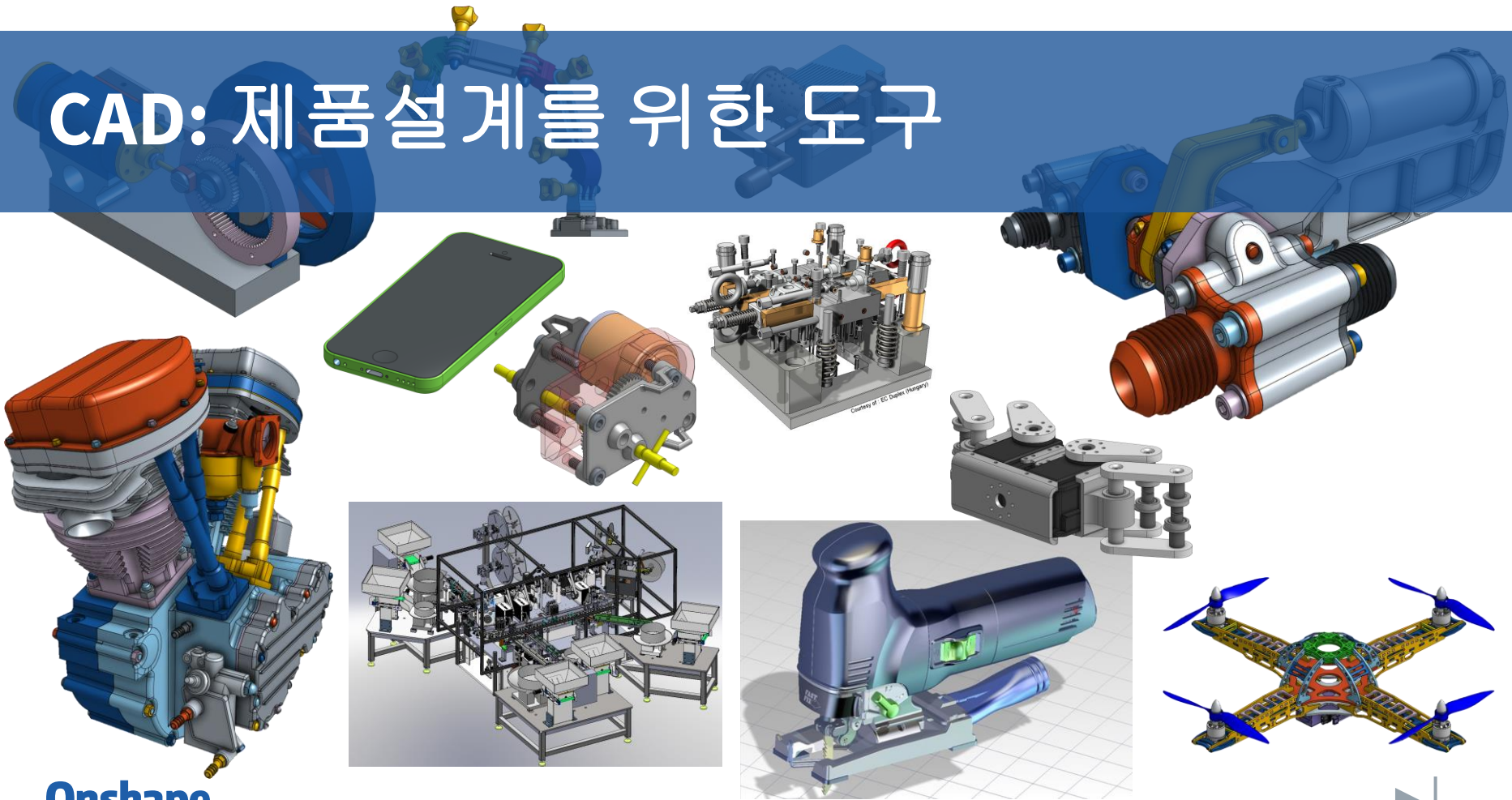


CAD의 미래, 그리고 제품 설계의 미래

The Future Of CAD

Ved Narayan (베드 나라얀)
VP Asia Pacific
May 25, 2016
Seoul, Korea

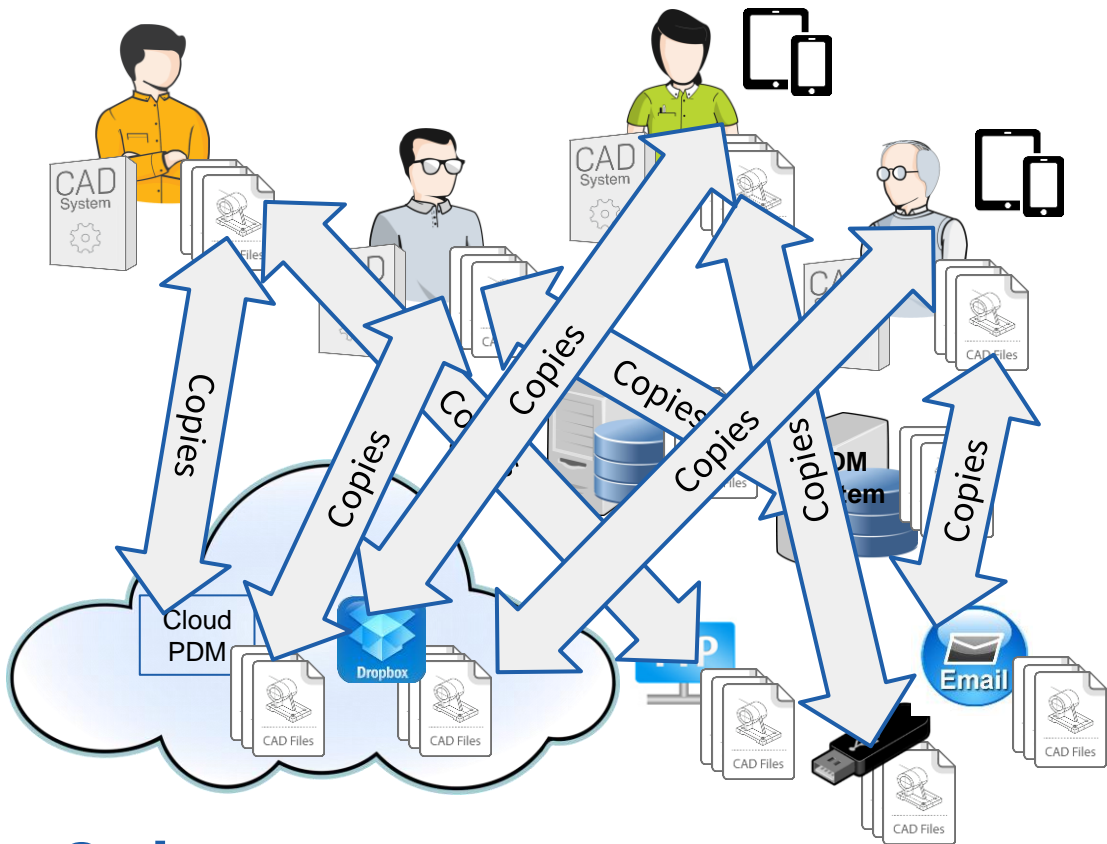
CAD: 제품설계를 위한 도구



Onshape



기존 파일 기반 CAD의 팀 업무 지연



CAD 시스템 문제

- 고가의 비용 (최소 5백만원 이상), Windows OS 만 지원
- 다운로드, 설치, 업데이트, 서비스 팩
- 라이선스 코드와 서버
- 충돌 및 데이터 손실
- 모든 사용자가 동일한 CAD 시스템 버전을 사용하나요?

CAD 파일 문제

- 수 많은 CAD 복사본 생성
- 최신 버전이 어디에 있나요?
- 남의 데이터를 덮어 쓴 적이 있나요?
- 누군가가 나의 데이터에 추가 작업을 했나요?
- 체크아웃과 잠금과 같은 불편함



Onshape: 새로운 세대의 풀 클라우드 CAD



CAD 시스템과 CAD 데이터베이스가 클라우드라는 한 공간에 있습니다.

다운로드와 설치가 필요 없습니다.

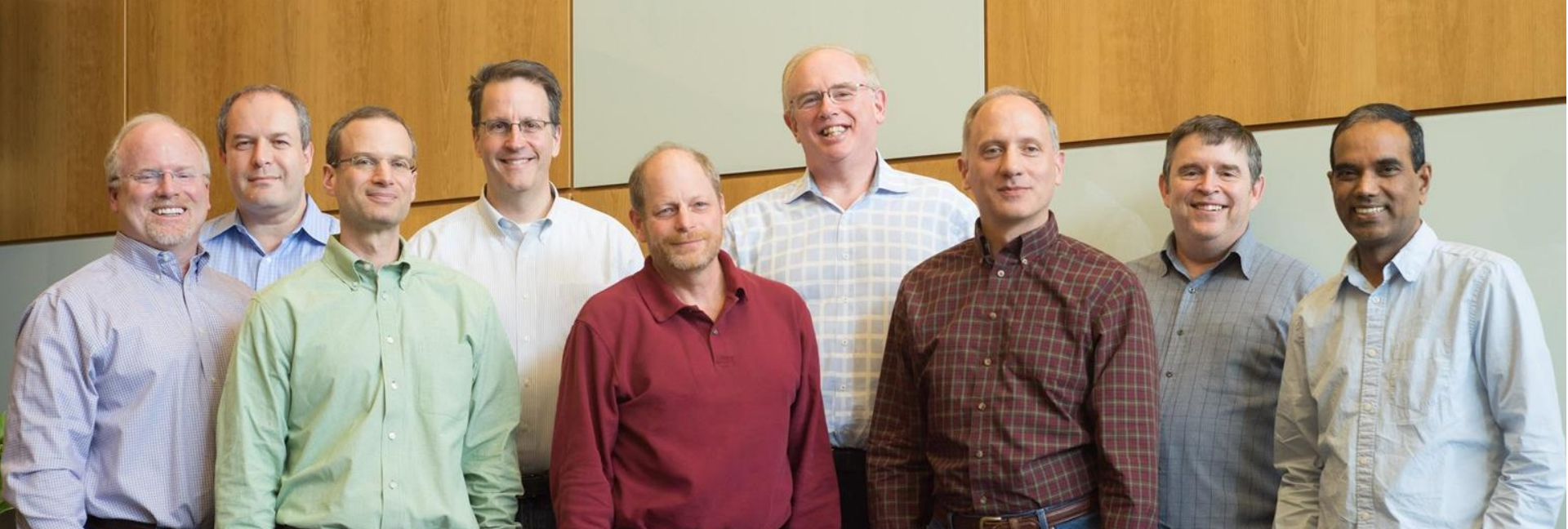
파일과 사본이 필요치 않습니다.



Onshape Inc.

- > 클라우드와 모바일 CAD에만 100% 집중하는 유일한 회사
- > 1,000여개의 기업이 이미 Onshape를 선택
 - 소비자, 기계, 의료 및 기타 여러 산업
- > 2012년 설립
 - 메사추세츠 캠브리지 소재
 - 1억 6천 9백만 달러 벤처 캐피탈
 - 100여명의 임직원
 - 원년 SolidWorks 팀
 - 클라우드와 모바일, 데이터 센터 전문가





존 맥클리니

John McEleney
CEO

CEO SolidWorks &
CloudSwitch

댄 쇼어

Dan Shore
CFO

CFO Harvard

존 루소

John Rousseau
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Verizon, CloudSwitch

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Dave Corcoran
VP R&D

VP R&D SolidWorks

일리야 미어맨

Ilya Mirman
VP Marketing

VP Marketing Vmturbo,
SolidWorks

스콧 헤리스

Scott Harris
VP User Experience

Co-founder SolidWorks

미셸 라우어

Dr. Michael Lauer
CTO

SolidWorks, Revit, MIT PhD

라비 리디

Ravi Reddy
Systems Lead

Chief Architect Bladelogic

단지 일년 전에 Onshape를 세상에 소개했습니다...

정말 멋진 한 해였습니다!

우리는 많은 것을 만들었습니다...

Onshape



2015: 125개의 새로운 기능을 포함한 14번의 업데이트

BETA
On

March 16, 2015

- Split Curve
- Progressive Graphics
- SolidWorks Pack and Go Support
- Gear and Rack & Pinion
- View Support Tickets Dashboard

April 6, 2015

- Mate Offset distance
- Screw/Linear Relations
- Driven Dimension
- Add/delete spline points
- Adding or Duplicating a Tab
- Remove Yourself from Shared Document
- Reactivate a Canceled Subscription

April 22, 2015

- Sketch Patterns
- Comments
- Scale
- Change Value by Increments
- Option to opt-out of screenshot in Feedback
- DWG/DXF output uses AutoCAD Release 11
- Export help in HTML/PDF formats
- Feedback tool now in Help

May 14, 2015

- Loft
- Ellipse
- Change to normal to (n)
- Comment notification by email
- Import/Export Workflow Improvement
- Public Document Sharing Modifications
- Share with Onshape Support Button

June 5, 2015

- Part Studio Compare
- Named view
- Symmetric sketch constraint
- Add/change emails to your Onshape account.
- Measurement precision has been increased

June 26, 2015

- Feature List filter
- Copy/Paste Sketches
- Silhouette Tool
- Second end position Extrude
- Hide/Show Using Groups
- Reset mates in sub-assemblies from the top assembly
- Assembly selection boxes same name/color as Part List
- Arrow key navigation on the Documents page
- Rename and copy workspaces from the Documents page
- Version selection on Parasolid export.
- View cube corners on all corners
- Zoom to selection in the view tools cube

July 17, 2015

- Sketch Text
- Copy Paste sketch entities
- Comment Tagging
- Hollow
- Boolean operations in Mirror/Pattern tools.
- Surface Visualization
- Filter feature list by parts
- Offset Ellipsoid
- Changed Fonts for consistency
- Version graph filter
- Invite and share to multiple users
- Refinement of tabs and measure area

August 6, 2015

- Hole and Derived feature
- Import DXF/DWG into sketches
- Mate limits, Materials, Document Enhancements
- View constraints when errors exist
- Updated UI in Manage Account screens
- STL out from Assemblies

August 31, 2015

- Drawings
- Extrude with draft
- Fillet manipulator
- Negative dimensions
- Diameter dimension support for revolved sketches
- Loft improvements
- Additional materials
- Teams, Companies, and plans

September 18, 2015

- Mate Indicators
- Print Preview
- Export from anywhere
- Copy parts with Mates in Assemblies
- Alignment options in Drawings
- Drawing dimension palette symbols
- Mate connectors as CSYS for Mass props
- Multi-select in Documents Page
- Drawings line weights scale with zoom
- Drawing performance improvements

October 12, 2015

- Sketch Image
- Local variables
- Transform with Mate connectors
- Wake up midpoints
- Drawing tables
- Pinned Assembly comments
- Two direction revolve
- Split surfaces
- Line to Point and Line to Line dimensions
- Hide improvements
- 3D Print materials
- ANSI millimeter drawing templates
- Copy/Paste of Notes in Drawings
- Drawing preview performance by 50%
- Deleting parts removes the associated mates.

October 29, 2015

- Show mate values
- Plane improvements
- Transfer ownership
- Center point arcs
- Share with support from Feedback
- Custom drawing templates
- Plane by Line Angle
- New Documents owned by Company
- Documents made public from Documents page
- Reorder Drawing sheets
- Optional view label
- Symbol pulldown menu in Drawings notes

November 30, 2015

- Intersection sketches
- Split face with sketch entities
- Sketch picture improvements
- Detail views
- Line-to-Line centerlines
- Better mate connector naming
- Drawing view projection preview performance
- Persistent Drawing note text size
- Invite a friend now allows for a personal message.

December 30, 2015

- Geometric Tolerances
- Datum Symbols
- Edit detail view envelope
- Drawing properties flyout
- 3D mouse pan and zoom in drawings

On

December 2015
Beta Testing Ends
Onshape Released

2016: 이미 5번의 업데이트

On

January 28, 2016

- Unified Versions and History
- Dimension while you sketch
- Standard holes
- Import / Export Rhino files
- Drawing functionality updates
- DXF / DWG version support for Sketches

February 15, 2016

- Tangent Mate
- Feature Pattern
- Transform Sketch Entities
- Measure Tool
- Zoom to window
- Document description
- Drawings functionality updates

March 8, 2016

- Mate Relation improvements
- Create version command
- Ordinate dimensions in Onshape Drawings
- Rotate drawing views
- Improved graphics on curved edges
- Improvements to Feature Patterns and Derived Features
- Improvements to centerlines
- Flatten 3D curves to lines in drawing views
- Snap mode when inserting components

March 31, 2016

- Mirror Feature
- Mate Display
- Part Studio Thumbnails
- Grid View in Documents page
- No sign-in & View Only Share
- DXF / DWG Export

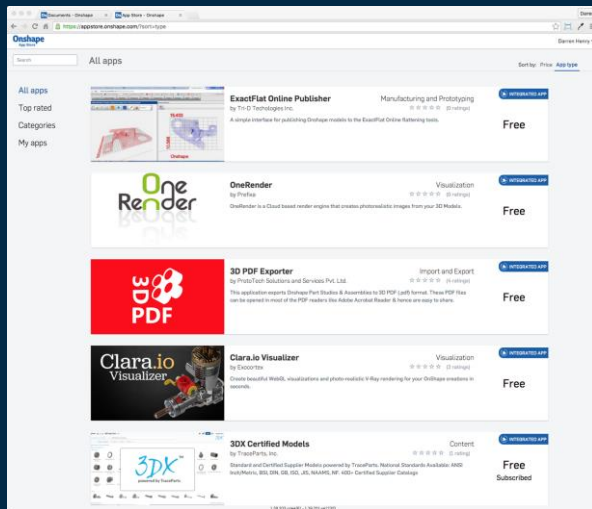
April 14, 2016

- Linked Documents
- Constraint Improvements
- Open Model from Drawing view
- Assembly expressions
- Improved large assembly render performance

Onshape 앱 스토어

풀-클라우드 CAD가 가진 27여개의 파트너 앱

- > 시뮬레이션
- > 캠(CAM)
- > 렌더링
- > 콘텐츠
- > 그 외...



Onshape App Store - Simulation

All apps / Categories / Simulation

SimForDesign Simulation
by Fidesys (9 ratings)

SimForDesign offers the first fully integrated Onshape application for simulation. All simulations are run in the cloud with the SimForDesign: mesh, problem definition, results and report are stored as tabs in your Onshape document.

Free trial & compute r then \$ 25/ via Onshay AppStore

simulationHub Simulation
by Centre for Computational (7 ratings)

simulationHub is cloud-based CFD process in easy to use five s solve and view results.

SIMSOLID Simulation
by SIMSOLID Corporation (1 rating)

SIMSOLID, an innovative simula analyses of structural systems, y and does not use a mesh

SimLab Composer Si
by Simulation Lab Software (1 rating)

A unique application focusing on models. It allows you to perform images, and share 3D models as

SimScale Simulation
by SimScale GmbH (1 rating)

The SimScale Connector App all SimScale, the cloud-based engine Mechanics (FEA), Fluid Mechanic directly in your web browser.

Onshape App Store - Manufacturing

All apps / Categories / Manufacturing

Clara.io Visualizer
by Exocortex (1 rating)

Create beautiful WebGL visualizations and OnShape creations in seconds.

OneRender Rendering
by Prefixa (1 rating)

OneRender is a Cloud based render engine from your 3D Models.

RealityServer Rendering
by migenius (1 rating)

VisualIMPORT
by MecSoft Corporation (1 rating)

This application allows in desktop product VisualC Visual/CAD's plug-in in Visu Visual/CAM includes a co

Onshape Conne
by CNC Software, Inc. (1 rating)

Access your Onshape an documents and download them.

Kiri:Moto CAM
by GRID.SPAC (1 rating)

CAM/CNC 2.5-axis tool-p Printing mode provides p additional Laser mode of output.

KeyShot
by KeyShot (1 rating)

Onshape App Store - Manufacturing

All apps / Categories / Manufacturing

3DX Certified Models Content
by TraceParts, Inc. (7 ratings)

Standard and Certified Supplier Models powered by TraceParts. National Standards Available: ANSI Inch/Metric, BSI, DIN, GB, ISO, JIS, NAAMS, NF. 400+ Certified Supplier Catalogs

SolidParts Content
by SolidPartners (7 ratings)

SolidParts library of native Onshape standard hardware parts.

3DPrintCloud Print Preparation Manufacturing
by Materialise NV (1 rating)

Prepare your designs for 3D Printing and avoid print failures. Tools include model analysis and automatic repair to ensure a manifold STL file, wall thickness analysis and parameter extraction.

10 Free model repairs/optimizations, then \$1.85 (or less) per model

ExactFlat Online Publisher Manufacturing
by Tri-D Technologies Inc. (1 rating)

A simple interface for publishing Onshape models to the ExactFlat Online flattening tools.

Flattening free forever. Downloads first 3 free, then \$25 per download

PrintNow Manufacturing
by CloudDDM (1 rating)

High resolution, dimensionally accurate 3D printed parts made from real engineering thermoplastics delivered as fast as next morning. Automated quotes and online ordering make the process easy and fast.

Free quotes. Pay for the 3D printed parts you order

A laptop is shown from a slightly elevated angle, resting on a wooden surface. The screen displays the Onshape web-based CAD application. The interface includes a browser address bar with a long URL, a top navigation bar with the Onshape logo and 'Sample - Engine' title, and a left-hand sidebar with a tree view of the model's instances. The main workspace shows a 3D CAD model of a mechanical assembly, likely an engine, with various components like bearings and shafts visible. A semi-transparent blue banner is overlaid across the middle of the screen, containing the text 'A Look At Onshape' in white. The background is a blurred indoor setting.

A Look At Onshape

우리가 사용자로 부터 배운 것:

클라우드와 모바일 CAD인 Onshape의
약 1백만 시간 이상의 사용자들...

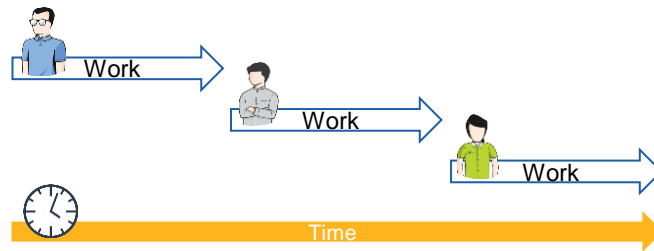
그리고, 그들이 말한 Onshape의 장점



Onshape를 통한 빠른 협업환경

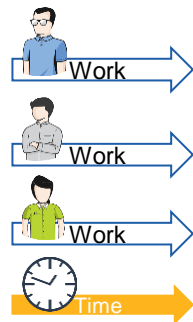
기존 CAD

- > 파일과 복사본
- > 다른 사용자 작업 종료시까지 대기
- > 최신 버전이 어디에 있는지에 대한 근심
- > 각 사용자의 변경 사항이 덮어 써질 것에 대한 걱정
- > 체크아웃, 복사, 알림, 체크인, 동기화와 같은 추가 작업
- > 순차적인 워크 플로우
- > 더 많은 시간 소요



Onshape

- > 데이터 베이스 중심: No 파일, No 복사본
- > No 기다림
- > No 걱정
- > No 체크아웃, 복사, 체크인
- > 동시병행 워크 플로우
- > 더 적은 시간 소요

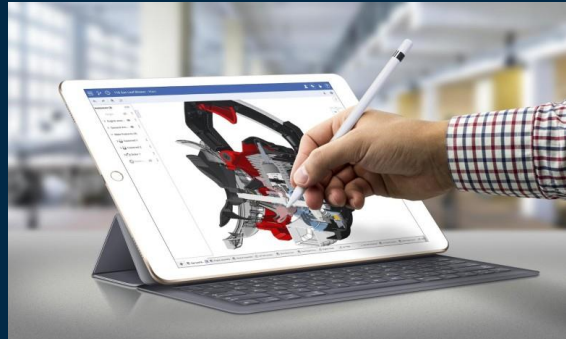


예, CAD 사용자는 모바일에 있습니다

- > Onshape 세션의 **6개 중 1개**는 모바일 디바이스에서 진행됩니다.
- > 사용자는 **CAD 편집 및 버전 제어**를 모바일 디바이스에서 진행합니다. (뷰어 뿐만 아닌)

Sample Onshape Mobile Usage Data

<input type="checkbox"/>	1. extrude	38,414 (27.86%)
<input type="checkbox"/>	2. newSketch	34,528 (25.05%)
<input type="checkbox"/>	3. fillet	12,718 (9.23%)
<input type="checkbox"/>	4. hole	6,073 (4.41%)
<input type="checkbox"/>	5. revolve	5,160 (3.74%)



CAD Reliability의 새로운 표준

- > 99.9% 이상의 가동율
- > 사실상 제로(Zero)인 충돌과 작업손실
 - Onshape 만의 풀 클라우드 아키텍처는 그 신뢰성이 입증되었습니다



Onshape를 이해하기 위한 새 프로젝트

> 예시:

- 새로운 제품 디자인
- 고급 R&D
- 금형 / 치구
- 공급업체와의 협업 등

> 여러 장소, 여러 사람, 협력업체와 협업, 여러 브랜치, 빠른 변경

> 기존 CAD의 사용을 중단 할 필요가 없습니다.

- 기존 프로젝트를 위한 기존 CAD 사용을 유지하세요.



그리고 이제,

우리가 여지껏 보지 못했던
Onshape의 새로운 기능

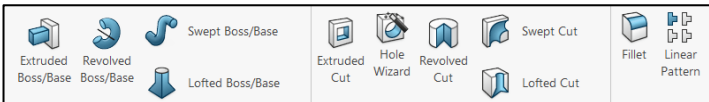
Onshape



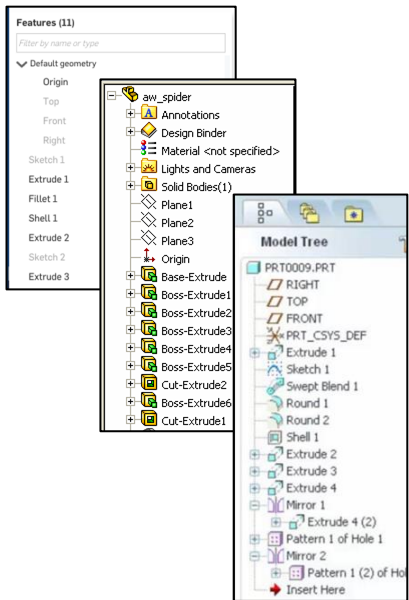
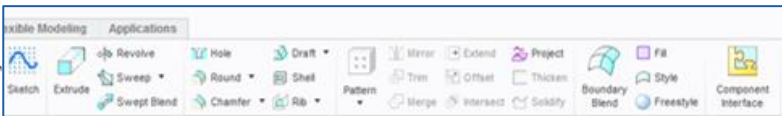
Onshape



SOLIDWORKS



PTC creo



> 모든 피처 기반의 파라메트릭 CAD 시스템은 피처를 가지고 있습니다.

- 돌출, 필렛, 쉘, 구멍, 패턴, 구배 등

> 이러한 기본으로 제공되는 피처는 CAD회사에서 프로그래밍 되어 집니다.

- 회사 내부에서만 소스 코드가 공개됩니다.

Onshape





이런 생각을 해 보셨나요...

- > 특정 피처가 다른 기능으로 작동
- > 원하는 기능의 피처를 추가할 수 있을까?
- > 이런 부분에 대해 무엇을 할 수 있을까요?
 - CAD 회사에 개선 사항 요청
 - 아마 몇 년이 걸릴 수도 있습니다...
 - 또는 “매크로” 나 “API”를 시도
 - 절대 내장된 피처와 같이 작동되지 않습니다.
 - CAD회사에서 어떻게 피처를 프로그래밍했는지 알 수 없습니다.

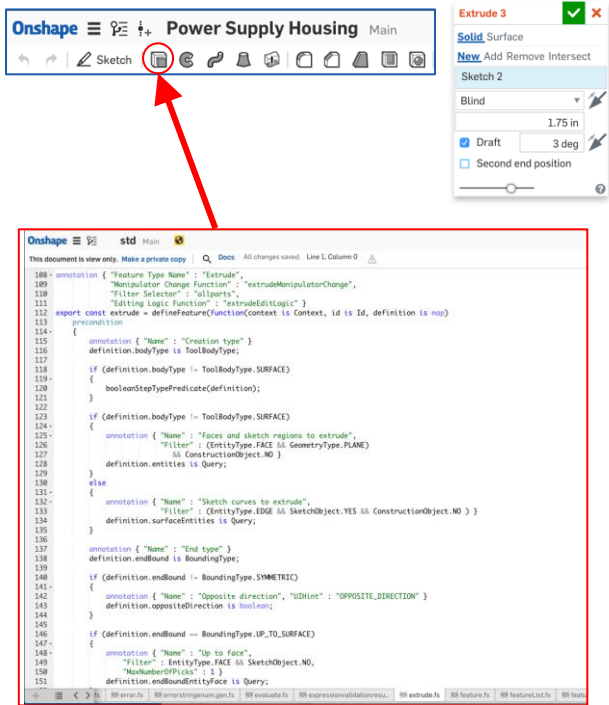


그래서 Onshape는 다른 방식으로 개발했습니다...

우리는 **사용자**가 Onshape 피처를
재사용, 확장, 변경하거나 새로운 기능을 만들 수
있도록 개발했습니다.



피처스크립트(FeatureScript): 피처를 정의하는 언어



- > 피처스크립트는 새로운 프로그래밍 언어입니다.
- > 파라메트릭 CAD 피처를 정의하기 위해 특별히 개발했습니다.
- > Onshape의 초기 개발 단계부터 구축했습니다.
- > 모든 Onshape의 유저들이 이미 피처스크립트를 수백만 시간 사용했습니다.
- > Onshape에서 제공하는 내장된 피처는 모두 피처스크립트로 쓰여졌습니다.
 - 돌출, 필렛, 쉘, 로프트, 등등



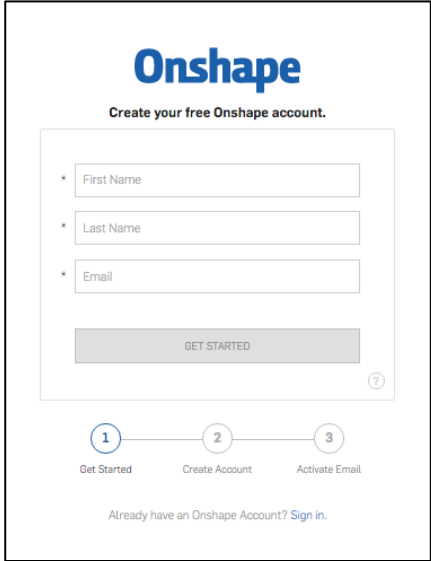
A laptop is shown from a slightly elevated angle, resting on a wooden surface. The screen displays the Onshape web-based CAD application. The interface shows a 3D model of a complex mechanical part, likely an engine component, with various features and assembly instances visible. The browser address bar shows a URL starting with 'https://cad.onshape.com/'. A blue semi-transparent banner is overlaid across the middle of the screen, containing the text 'A Look At Featurescript'.

A Look At Featurescript

풀-클라우드 CAD를 시작해보세요

<http://onshape.co.kr> 에서
무료 Onshape 계정을 만드세요

Onshape로 프로젝트를 진행해보세요



The screenshot shows the Onshape account creation interface. At the top, the Onshape logo is displayed in blue, followed by the text "Create your free Onshape account." Below this, there is a form with three input fields: "First Name", "Last Name", and "Email", each with a red asterisk indicating a required field. A "GET STARTED" button is positioned below the form. To the right of the button is a help icon (a question mark in a circle). Below the form, a progress indicator shows three steps: 1. Get Started (with a blue circle around the number 1), 2. Create Account, and 3. Activate Email. At the bottom, there is a link for users who already have an account: "Already have an Onshape Account? Sign In."

Onshape 한국 웹사이트: www.Onshape.co.kr

Onshape 한국 공식 지원센터:

(주)클라우드이엔지 www.CloudENG.co.kr





THANK YOU

Onshape