

# Mobile eSignature solution

Page owner	Yannan Liu
Contributors	Moritz Arnt
Status	IN PROGRESS

OS: Windows, iOS, Android

## Positioning

- For business managers who need to sign the documents in the office, now during COVID-19, sign pro PDF can provide you legally binding eSign solution, and ensure business workflow continuity without site visits or paper printing and scanning
- Mid-long term: for enterprise users, wacom eSignature solution provides flexibility and security for business workflow

## Pain Points

1. do you have to collect paperwork - like forms, signatures, invoice ? How do you manage it during COVID-19?
2. as a business manager, you need to approve employee orders or sign recruitment? how do you manage it during COVID-19?
3. does it work if my laptop does not have stylus, but only Samsung galaxy note phone , or iPhone ?

## Use Cases

- In biz environment, the managers travels and work remotely away from office, but he/she needs to sign HR recruitment letter, sign vendor contracts, business workflow digitally with Wacom electronic signature technology (COVID-19)
- In Healthcare industry, the doctor needs to do patient rounds every morning, a mobile tablet + stylus + application to replace paper but easily load patients information for form-filing and signing.
- Public sector /Police live-criminal investigation confirmation and consent

## Solution:

- sign pro PDF for Windows / Android /iOS
- Pen-enabled laptop with Windows OS, iOS or Android devices with stylus

## Value proposition

- remotely, flexibly manage workflow for signing and annotating
- handwritten electronic signature legally binding
- cross platform capability

## Prototype Concept

- Option A : existing MPP or AES protocol mobile tablet - see following list of devices
- Option B : PoC ->8" Pen & Touch display + WiFi for cloud connection + Linux
- additionally considering fingerprint - front and back camera
- light weight and portable
- Ergonomics
- Cost

## Vendors Overview

Brands	Overview
Acer	Less than 13.5" tablet in Chrome OS, larger than 13.5" in Windows OS, 15.6" and 17.3" Notebook PC segment, mostly AES pen tech
Dell	Most of the listed devices are 2in1 Hybrid function, positioned as Tablet PC segment based on WindowsOS; screen size range from 11.6" ~ 15.6", mostly AES pen tech

Lenovo	Position Yoga brand is tablet PC (range from 9.7" ~ 13.3"); Think brand is Notebook (range from 13.3" ~ 15.6"), AES
Fujitsu	2019 new models 13.3" LIFEBOOK, ARROWS Tab are all positioned in Tablet PC segment. This approves the hybrid direction and trend based on market needs
HP	Screen size range from 11.6" ~ 15.6" are all in category 'Tablet PC', The new models are based on Windows OS. Some old model with Chrome OS.
Samsung	5.7"~6.8" is Smartphone with Android (Galaxy Brand); 8"~12" is Tablet PC with Android (Galaxy Brand), 12.2" ~15" Notebook PC with Windows OS. From the new models brand positioning, the hybrid strategy is clearly adapted to market trend.  The new Notebook segment model Galaxy Book Flex 13 and Galaxy Chromebook are both 13.3" devices. This approves trend of 13.3' are more towards hybrid 'tablet' and 'notebook' segments.

## List of Pen-Enabled Devices

### Android and Chromebook tablets and devices

Model	SoC / CPU	sizes	resolution	AR	storage	RAM	lbs	in.	digitizer	stow
Dell Inspiron 7486 Chromebook 14	Core i3-U 8th	14	1920x1080	16:9	128GB	4GB	4	0.7	Wacom EMR	silo
HP Chromebook x360 (late 2019)	Celeron N4000	12-14	1920x1080	16:9	64GB	4GB			USI	
Acer Chromebook Spin 13	Core i5-U 8th	13.5	2256x1504	3:2	128GB	16GB	3.5	0.67	Wacom EMR	silo
Google Pixel Slate	Core i5-Y 8th	12.3	3000x2000	3:2	128GB	8GB	1.6	0.3	Wacom EMR	
Google Pixelbook	Core i5-Y 7th	12.3	2400x1600	3:2	256GB	8GB	2.4	0.4	Wacom AES	
HP Chromebook x2	Core i5-Y 7th	12.3	2400x1600	3:2	256GB	8GB				
Samsung Chromebook Plus / Pro	ARM / Core m3 6th	12.3	2400x1600	3:2	32GB	4GB	2.5	0.5	Wacom EMR	silo
Samsung Galaxy NotePro	Exynos 5 / Snapdragon 800	12.2	2560x1600	16:10	64GB	3GB	1.6	0.31	Wacom EMR	silo
Huawei MediaPad M5 10 Pro	Kirin 960	10.8	2560x1600	16:10	128GB	4GB	1.1	0.29	M5 Pro	
Samsung Galaxy Tab S6	Snapdragon 855	10.5	2560x1600	16:10	256GB	8GB	0.93	0.22	Wacom EMR	
Samsung Galaxy Tab S4	Snapdragon 835	10.5	2560x1600	16:10	256GB	4GB	1.06	0.28	Wacom EMR	
Samsung Galaxy Note 10.1 2014	Exynos 5420 / Snapdragon 800	10.1	2560x1600	16:10	64GB	3GB	1.18	0.31	Wacom EMR	silo
Huawei MediaPad M5 Lite	Kirin 659	10.1	1920x1200	16:10	64GB	4GB	1.04	0.30	M5 Lite	
Samsung Galaxy Tab A (2016)	Exynos 7870	10.1	1920x1200	16:10	32GB	3GB		0.32	Wacom EMR	silo
Huawei MediaPad M2	Kirin 930	10.1	1920x1200	16:10	64GB	3GB	1.1	0.29	Wacom AES	
Acer Chromebook Tab 10	RK3399	9.7	2048x1536	4:3	32GB	4GB			Wacom EMR	
Samsung Galaxy Tab S3	Snapdragon 820	9.7	2048x1536	4:3	32GB	4GB	0.96	0.24	Wacom EMR	
Asus ZenPad 3S 10	MT8176	9.7	2048x1536	4:3	64GB	4GB	0.95	0.28		
ASUS ZenPad S 8 Z580CA	Atom Z3530	8	2048x1536	4:3	64GB	4GB	0.70	0.27	N-trig	

Older models:

Model	SoC / CPU	sizes	resolution	AR	storage	RAM	lbs	in.	digitizer
Wacom Cintiq Companion Hybrid†	Tegra 4	13.3	1920x1080	16:9	32GB	2GB	3.9	0.6	Wacom EMR
HP Pro Slate 12	Snapdragon 800	12.3	1800x1200	4:3	32GB	2GB	1.9	0.31	Qualcomm
Toshiba Excite Write	Tegra 4	10.1	2560x1600	16:10	32GB	2GB	1.48	0.4	Wacom EMR
Samsung Galaxy Note 10.1	Exynos 4412	10.1	1280x800	16:10	64GB	2GB	1.32	0.35	Wacom EMR
Asus ZenPad 10	Atom x3-C3200	10.1	1280x800	16:10	64GB	2GB	1.12	0.31	N-trig
Lenovo Thinkpad Tablet	Tegra 2	10.1	1280x800	16:10	64GB	1GB	1.65	0.55	N-trig
HTC Jetstream	Snapdragon 1.5 GHz	10.1	1280x800	16:10	32GB	1GB	1.54	0.5	N-trig
Samsung Galaxy Tab A (2015)	Snapdragon 410	9.7	1024x768	4:3	16GB	1.5GB	1.04	0.29	Wacom EMR
Nvidia Shield Tablet	Tegra K1	8	1920x1200	16:10	32GB	2GB	0.86	0.36	Nvidia
Samsung Galaxy Note 8.0	Exynos 4412	8	1280x800	16:10	32GB	2GB	0.76	0.31	Wacom EMR
HP Pro Slate 8	Snapdragon 800	7.9	2048x1536	4:3	32GB	2GB	0.77	0.31	Qualcomm
Tegra Note 7	Tegra 4	7	1280x800	16:10	16GB	1GB	0.70	0.38	Nvidia
HTC Flyer / EVO View 4G	Snapdragon 1.5 GHz	7	1024x600	5:3	32GB	1GB	0.91	0.52	N-trig

†The Cintiq Companion Hybrid can also function as an input device.

iPad pressure-sensitive styluses

Model	devices	apps	palm detection	reviews
Apple Pencil 2	iPad Pros (late 2018)		yes	
Apple Pencil	Early 2018 iPads and iPad Pros		yes	
FiftyThree Pencil	retina iPads; iPad Airs; iPad Minis	Paper app	yes	
Adobe Ink & Slide	retina iPads; iPad Airs; iPad Minis	Line and Sketch app	yes	
iSketchnote	iPad 3, 4; iPad Airs; iPad Minis	iSketchnote app	yes	
Adonit Jot Touch	iPad 3, 4; iPad Airs; iPad Minis		supported	
Wacom Intuos Creative Stylus 1 / 2	iPad 3, 4; iPad Air 1; iPad Minis		supported	
Wacom Bamboo Stylus Fineline 1 / 2	iPad 3, 4; iPad Airs; iPad Minis		supported	
Ten One Pogo Connect	iPad 3, 4		supported	

Desktop PCs

Model	type	CPU	sizes	resolution	AR	PPI	dGPU	SSD	RAM	digitizer	stow
Lenovo Yoga A940	all-in-one	i7 8th	27	3840x2160	16:9	163	RX560	1TB	32GB	Wacom AES	dock

Windows notebooks, tablets, and convertibles

Intel quad-core CPU or similar

Detachable or no keyboard

Model	type	CPU	sizes	resolution	AR	PPI	TB3	dGPU	SSD	RAM	lbs	in.	digitizer	stow
Microsoft Surface Book 2 15	hybrid	i7 8th	15	3240x2160	3:2	260	no	GTX1060	1TB	16GB		0.57	Microsoft	magnetic
HP ZBook x2	hybrid	i7 8th	14	3840x2160	16:9	315	yes	M620	2TB	32GB	3.65	0.6	Wacom EMR	loop
Microsoft Surface Book 2 13.5	hybrid	i5-i7 8th	13.5	3000x2000	3:2	267	no	GTX1050	1TB	16GB		0.51	Microsoft	magnetic
Acer Switch 7	hybrid	i7 8th	13.5	2256x1504	3:2	201		MX150		16GB	2.5		Wacom EMR	silo
Fujitsu Stylistic Q738	hybrid	i5-i7 8th	13.3	1920x1080	16:9	166	yes		512GB	16GB	1.7		Wacom AES	silo
Lenovo ThinkPad X1 Tablet (2018)	hybrid	i7 8th	13	3000x2000	3:2	277	yes		1TB	16GB	1.9	0.24	Wacom AES	
HP Elite x2 1013 G3	hybrid	i3-i7 8th	13	3000x2000	3:2	277	yes		256GB	16GB	2.59	0.52	Wacom AES	loop
Microsoft Surface Pro 6	hybrid	i5-i7 8th	12.3	2736x1824	3:2	267	no		1TB	16GB	1.7	0.33	Microsoft	
Dell Latitude 5290	hybrid	i3-i7 8th	12.3	1920x1280	3:2	188	yes		1TB	16GB	1.89	0.42	Wacom AES	
Lenovo Miix 520	hybrid	i3-i7 6th / 8th	12.2	1920x1200	16:10	186	no		1TB	16GB	1.94	0.39	Wacom AES	

Fixed keyboard

Model	type	CPU	sizes	resolution	AR	PPI	TB3	dGPU	SSD	RAM	lbs	in.	digitizer	stow
Acer ConceptD 9	pivot	i9 9th	17.3	3840x2160	16:9	254	yes	RTX 2080	1TB	32GB	9	0.92	Wacom EMR	magnetic
Lenovo Thinkpad P70		i7HQ / Xeon 6th	17.3	1920x1080	16:9	127	yes†	M5000M	2TB	64GB	7.56	1.2	Wacom AES	
HP ZBook Studio x360	fold	i5H / i7H / i9 / Xeon 8th	15.6	3840x2160	16:9	282	yes	P2000	4TB	32GB	5	0.8	Wacom AES	
Asus Zenbook Pro UX550 / UX580		i5-i9HK 7th-8th	15.6	3840x2160	16:9	282	yes	GTX 1050Ti	2TB	16GB	3.96	0.74	Microsoft	
Lenovo ThinkPad X1 Extreme		i5 / i7 8th	15.6	3840x2160	16:9	282	yes	GTX 1050Ti	1TB	64GB	3.8	0.72	Wacom AES	
Lenovo Yoga 720 15 / 730 15	fold	i5 / i7HQ 7th-8th	15.6	3840x2160	16:9	282	yes	GTX 1050M	1TB	16GB	4.4	0.75	Wacom AES	
Dell XPS 15 9365 / 9575	fold	i5 / i7 8th	15.6	3840x2160	16:9	282	yes	RX Vega	1TB	16GB	4.3	0.63	Wacom AES	
HP Spectre x360 15	fold	i7H 8th	15.6	3840x2160	16:9	282	yes	GTX 1050Ti	2TB	16GB	4.4	0.7	Microsoft	
Asus Zenbook Flip 15	fold	i5 / i7 8th	15.6	3840x2160	16:9	282	yes	GTX 1050M	512GB	16GB	4.5	0.76	Microsoft	
Samsung Notebook 9 Pen / Pro	fold	i7 7th-8th	15.6	1920x1080	16:9	147	no	Pro 450	256GB	16GB			Wacom EMR	silo
Acer Spin 5 15	fold	i7 8th	15.6	1920x1080	16:9	141	no	GTX 1050M		8GB	4.9	0.7	Microsoft	
Lenovo Thinkpad X1 Yoga (2018)	fold	8th	14	3840x2160	16:9	315	yes		1TB	16GB	3.1	0.6	Wacom AES	
LG Gram 2-in-1	fold	i7 8th	14	1920x1080	16:9	157	no		1TB	16GB	2.52		Wacom AES	
Lenovo Yoga 530 / Flex 14	fold	i5-i7 8th	14	1920x1080	16:9	157	no	MX130	512B	16GB	3.5	0.7	Wacom AES	
HP Probook x360 440	fold	i3-i7 7th-8th	14	1920x1080	16:9	157	no	MX130	512B	16GB	3.8	0.78	Wacom AES	
Dell Inspiron 14 5482	fold	i3-i7 8th	14	1920x1080	16:9	157	no		512B	16GB	4.1	0.78	Microsoft	
LG Gram 14	fold	8th	14	1920x1080	16:9	157	no		512B	16GB	2.5		Wacom AES	
Asus Zenbook Flip 14	fold	i5-i7 8th	14	1920x1080	16:9	157	no		256B	8GB	3.1	0.55	Microsoft	

Lenovo Yoga 920	fold	8th	13.9	3840x2160	16:9	317	yes		1TB	16GB	3	0.55	Wacom AES	
Lenovo Yoga 720 13 / 730 13	fold	i5-i7 7th-8th	13.3	3840x2160	16:9	331	yes		512GB	16GB	2.9	0.5	Wacom AES	
HP Spectre x360	fold	i5-i7 7th-8th	13.3	3840X2160	16:9	331	yes		1TB	16GB	2.89	0.55	Microsoft	
Dell Inspiron 13 7386 2-in-1	fold	i7 8th	13.3	3840X2160	16:9	331	no		512GB	16GB	3.11	0.54		magnetic
Dell Latitude 13 5300 2-in-1	fold	i5-i7 8th	13.3	1920x1080	16:9	166	yes		512GB	16GB	3.15		Wacom AES	magnetic
Samsung Notebook 7 Spin (2018)	fold	i5-i7 8th	13.3	1920x1080	16:9	166	no		256GB	8GB	3.37	0.73	Microsoft	
Dell Latitude 7389 / 7390	fold	i3-i7 7th-8th	13.3	1920x1080	16:9	166	no		512GB	16GB	3.11	0.70	Wacom AES	
Samsung Notebook 9 Pen / Pro	fold	i7 7th-8th	13.3	1920x1080	16:9	166	no		256GB	8GB			Wacom EMR	silo
Acer Spin 5 13	fold	i5-i7 8th	13.3	1920x1080	16:9	166	no		256GB	8GB	3.5	0.63	Microsoft	
Dell Inspiron 13 5379	fold	i5-i7 8th	13.3	1920x1080	16:9	166	no		256GB	16GB	3.7	0.8	Microsoft	
Fujitsu Lifebook T938 / T939	swivel	i5-i7 8th	13.3	1920x1080	16:9	166	no		1TB	16GB	2.87	0.76	Wacom AES	silo
Lenovo Yoga 720 12	fold	i5-i7 8th	12.5	1920x1080	16:9	176	no		512GB	16GB	2.53	0.62	Wacom AES	
Toshiba Portégé X20W	fold	i5-i7 7th-8th	12.5	1920x1080	16:9	176	yes		512GB	16GB	2.34	0.61	Wacom AES	silo
Fujitsu Lifebook P728	fold	i3-i7 8th	12.5	1920x1080	16:9	176	no		512GB	16GB	2.65	0.74	Wacom AES	silo

‡available in some models

Intel Core m / Core i-Y CPU or similar

Model	type	CPU	sizes	resolution	AR	PPI	TB3	SSD	RAM	lbs	in.	digitizer	stow
Vaio A12	hybrid	i7 Y 9th	12.5	1920x1080	16:9	176	no	512GB	16GB	2.43	0.6	Wacom AES	

Pens

Microsoft

Microsoft / MPP / N-trig pens and devices are fully cross-compatible but only devices that support MPP 1.51 in conjunction with MPP 1.51 pens will not have slow line wobble. Using either 1.0 devices or 1.0 pens will have more severe wobble.

Model	battery	buttons	mic	tilt‡	laser	protocol
HP Tilt Pen	rechargeable	1 + <u>BT</u>	no	yes	no	MPP 1.51
Dell Premium Active Pen	disposable	2 + <u>BT</u>	no	yes	no	MPP 1.51
Surface Pen	disposable	1 + <u>BT</u>	no	yes	no	MPP 1.51†
Adonit Ink Pro	rechargeable	2 + <u>BT</u>	yes	no	yes	MPP 1.0
Wacom Bamboo Ink Plus	rechargeable	2 + <u>BT</u>	no	no	no	MPP 1.0 / 1.51
Wacom Bamboo Ink	disposable	2	no	no	no	MPP 1.0

Wacom AES

2017 and newer AES 1.0 devices are cross-compatible. Huawei devices are only compatible with their own pens. Devices with AES 2.0 digitizers support 1.0 and 2.0 pens. Devices with AES 1.0 digitizers only support 1.0 pens.

Model	battery	buttons	tilt‡	protocol
HP Rechargeable Active Pen	rechargeable	2 + BT	yes	AES 2.0
Lenovo Pen Pro	rechargeable	2 + BT	yes	AES 2.0
Wacom Bamboo Ink Plus	rechargeable	2 + BT	yes	AES 1.0 / 2.0
Dell Premium Active Pen	disposable	2 + BT	yes	AES 2.0
Lenovo Precision Pen	disposable	2 + BT	yes	AES 2.0
Lenovo Active Pen 2	disposable	2 + BT	no	AES 1.0
Wacom Bamboo Ink	disposable	2	no	AES 1.0
Wacom Bamboo Smart 2-in-1	disposable	2	no	AES 1.0
Lenovo Active Pen	disposable	2	no	AES 1.0

‡tilt requires tilt-supporting digitizer

## Wacom EMR

Wacom EMR devices from other vendors:

- Windows tablet PCs with Wacom "Feel" EMR pens and Samsung S-Pen devices are compatible with each other's pens, although some pen-device combinations may have larger cursor offsets than others, and tilt requires both tilt-supporting digitizer and pen.
- Commonly available pens (2018): ThinkPad X220, HP TC4200, Fujitsu T5000, Toshiba Z20t, Samsung Tab S3, Samsung S-Pens, Smardi S Pen Plus, Surface Pro 1, "UP" Wacom pens
- Some advanced Windows tablet PCs that are not branded with Wacom Feel or Penabled use a different version of EMR and are not compatible.

Wacom EMR devices from Wacom:

- Cintiq, Cintiq Pro, and Intuos Pro (formerly Intuos 5) devices are compatible with the Pro Pen 2, Pro Pen 3D, Classic Pen, Art Pen, Airbrush Pen, and Grip Pen.
- Intuos CTL 4100, 6100 are only compatible with Wacom Pen 4K
- Intuos devices with CTH/CTL model number 490, 690 are only compatible with LP-190 and LP-190E

Older Wacom EMR devices from Wacom:

- Bamboo or Intuos devices with CTH/CTL model number 460, 470, 480, 660, 670, 680 are only compatible with [LP pen models from 160 through 180](#).
- Wacom devices [with the same three-letter prefix](#) are compatible with each other's pens except the CTL/CTH models

## Manufacturer pen compatibility charts

- [Acer](#)
- [Dell](#)
- [HP](#)
- [Lenovo](#)

## Digitizers

- Wacom EMR - Wacom electromagnetic resonance battery-free pen. Favored by artists for faithful recreation of pen strokes. Older tablet PCs had a gap between the glass/plastic and the actual display, and major inaccuracy issues near the edges of the display in devices not directly manufactured by Wacom or Samsung. Current Wacom EMR devices have optically-bonded displays that minimize the gap and are much more accurate near the edges.
- Wacom AES - Wacom electrostatic pen with replaceable or rechargeable battery. Favored by note-takers for high accuracy, including at the edges of the display. AES 1.0 has lower position sensitivity and polling rate than Wacom EMR. Pens usually have 3 gram minimal stroke pressure, and a slight wobble when inking slowly. AES 2.0 should be as accurate as Wacom EMR.
- Wacom AES 1.0 - no tilt. Wacom AES 2.0 - tilt and higher polling rate on supported devices. Most AES 2.0 digitizers are backward compatible, but some (like Huawei devices) are only compatible with their first-party pens.
- Microsoft / MPP (formerly N-trig) - electrostatic pen with replaceable or rechargeable battery. Favored by note-takers for the same reasons as Wacom AES. Pens usually have 10-12 gram minimal stroke pressure, so they are less suitable for lighter strokes.
- MPP 1.0 - no tilt, wobbly slow lines. MPP 1.51 - tilt and no wobbly slow lines on supported devices. Devices are forward and backward compatible.
- Apple Pencil - similar to Wacom AES 2.0, it has a high polling rate and high position accuracy. Its tilt sensitivity is excellent because it has side-emitters for measuring tilt, while other protocols only have one emitter pointing down at the tip of the pen or a second ring-shaped emitter.
- Synaptics - Synaptics electrostatic pen with replaceable or rechargeable battery. Barely usable on devices made before late 2016. Some reviews found that devices from late 2016 have significantly improved, but recent user reports contradict this.
- USI - pens that support the Universal Stylus Initiative protocol should perform similarly to Wacom AES 2.0 and MPP 1.51 pens, and they should be cross-compatible across all USI-licensed devices. USI pens have become available in 2020 with a handful of supported devices.
- Nvidia - Nvidia capacitive pen.
- Qualcomm - Qualcomm ultrasonic pen with rechargeable battery
- optical - battery-powered pen-mounted camera
- Atmel, other - any other pressure-sensitive digital pen technology. Usually nearly unusable because of low accuracy, missed pen strokes, and other issues.