Realization of Team Productivity and Immersive Experiences Through Interactive Displays

February 21, 2019

David Slobodin

IdeaFarm





Presents the X Series

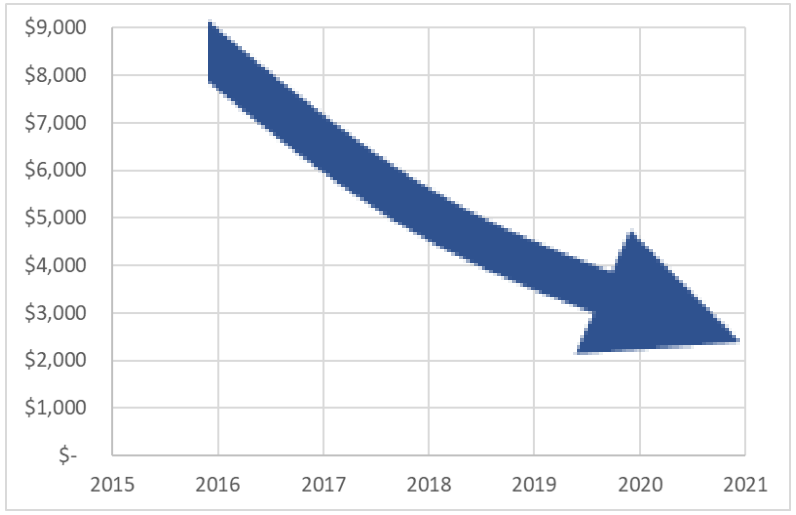


State of the Market

Market Trends

Falling Prices

55”-65” Interactive Flat Panel



Growing Market

50% CAGR

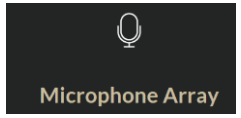
Unit Growth*

Improving Technology











*FutureSource Consulting

What's Really Going On?

- Promised productivity enhancement only partially realized
- Inconsistent and poor user experiences across rooms and companies
- Many features too complex or disruptive to use
- Team tools are inconsistent with personal workflow
- Demand driven by future-proofing and "fear of missing out" rather than clear results

Meetings and Productivity

Key Considerations for Meeting Productivity

Moving rooms and ad hoc inviting people

Guest participation

Reliability and availability of public resource (meeting room devices)

UC meeting startup, joining and control

AV quality and remote participant involvement

Presenting, contributing and saving content

Whiteboarding and team ideation

Meeting support (optimized environment, automating host tasks, simplifying post-meeting work)

Exploiting big display and interactivity

Meeting Types



BRAINSTORMING/IDEATION (WHITEBOARD, CONFERENCING, PRESENTATION)

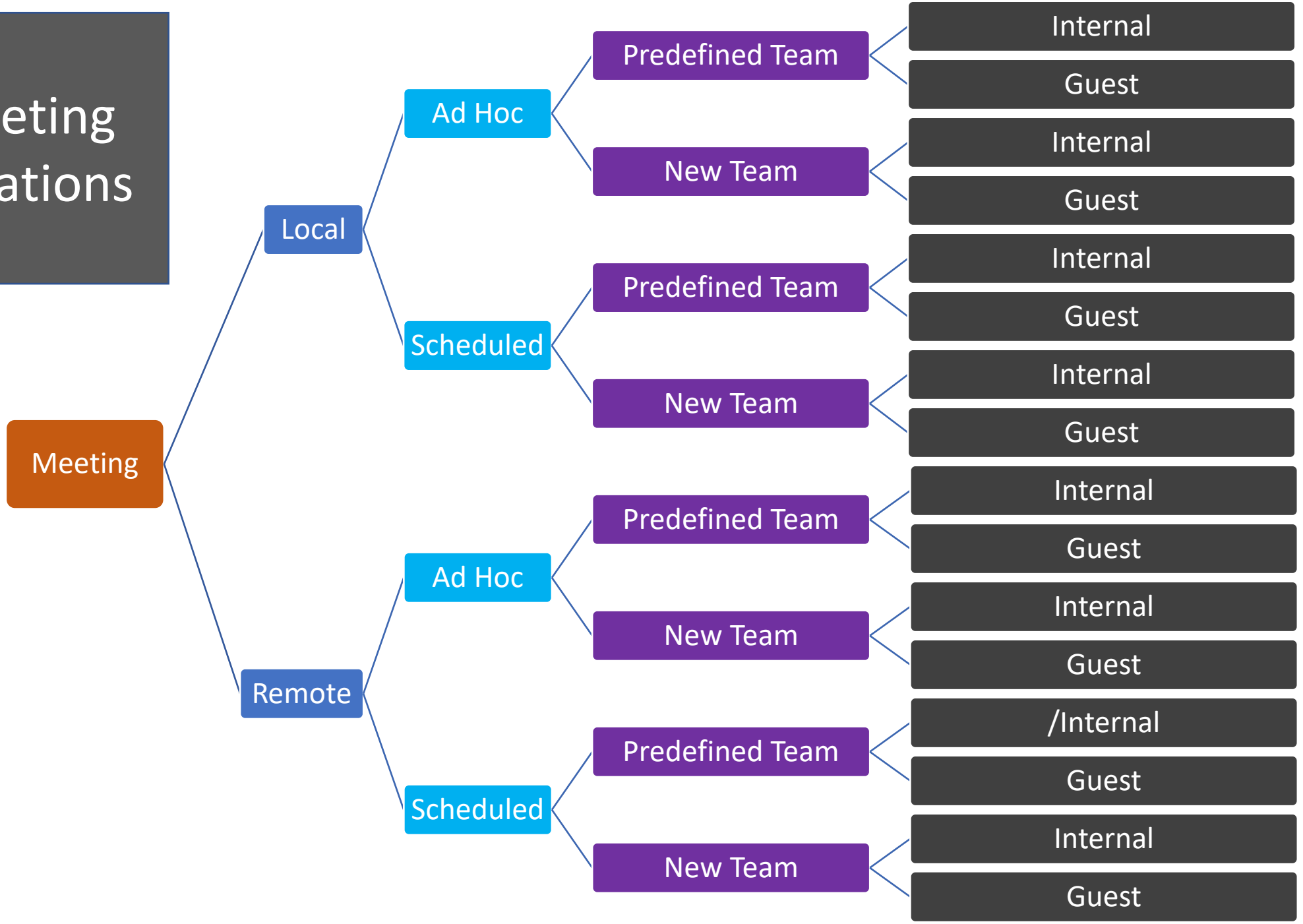


PRESENTATION/TRAINING (PRESENTATION, CONFERENCING, WHITEBOARD)

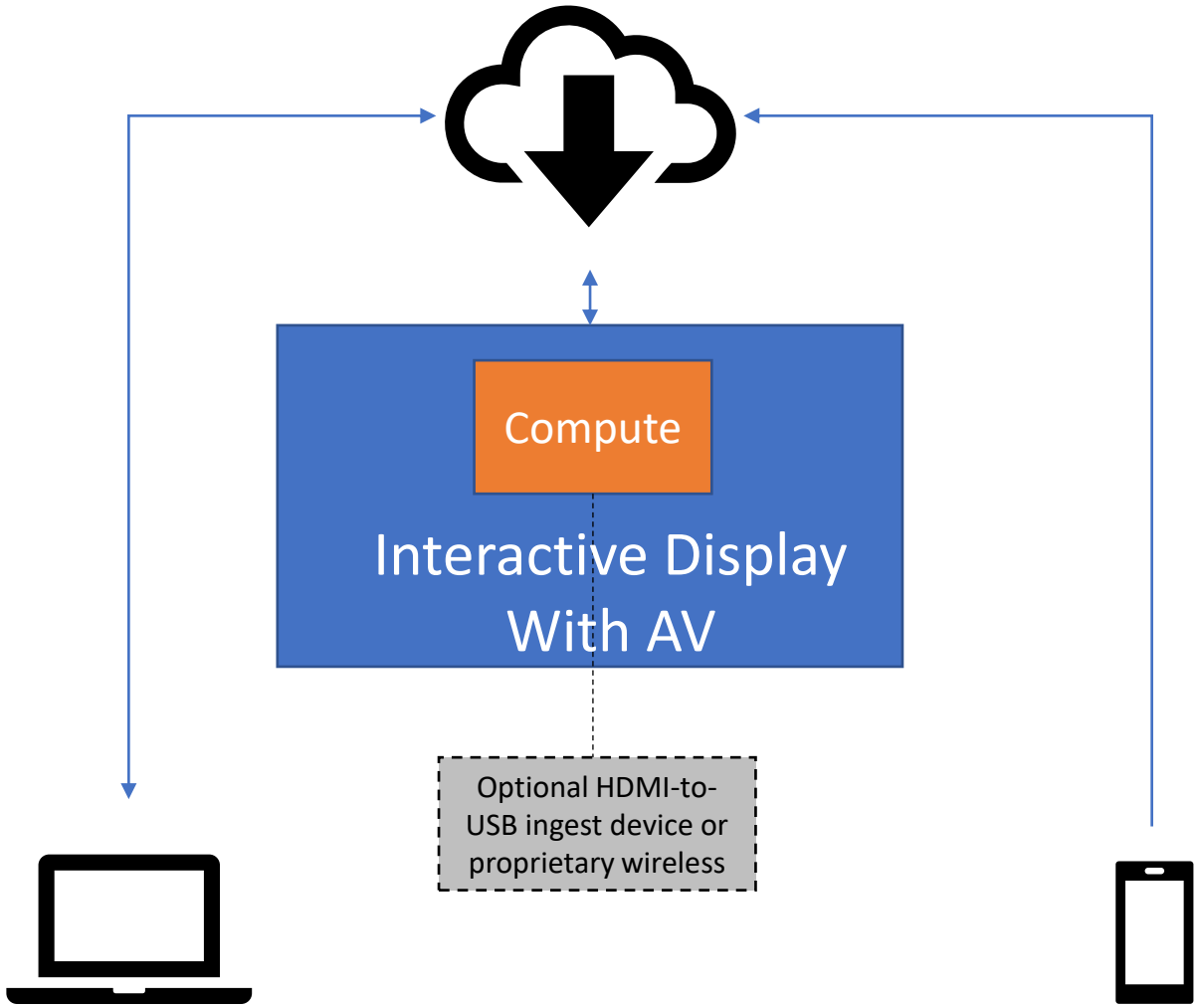


DISCUSSION/DECISION (CONFERENCING, PRESENTATION, WHITEBOARD)

Meeting Situations



Appliance Model



Pros

- UC platform solution
- Natural wireless presentation
- Same presentation approach whether local or remote
- Control through personal device or tabletop device
- Meeting host free to use personal device fully

Cons

- Guests may need internet access to present
- Presentation and interaction latency may be noticeable
- Limited whiteboard functionality
- Guest security could be an issue
- More devices to manage
- More security risks
- Compute requirement

Appliance Model Examples

Dedicated hardware and software

Jamboard

Microsoft Surface Hub

Cisco WebEx Board

Simple hardware set-up
Simple UI
Closed, inflexible
Single UC platform

UC platform

Microsoft Teams Rooms

zoomrooms

Hangouts Meet

BlueJeans Rooms

Simple to use
Single UC choice, inflexible
Weak whiteboard choices

Cross-platform UI software

intel UNITE

quicklaunch

ZiipRoom

Kickle

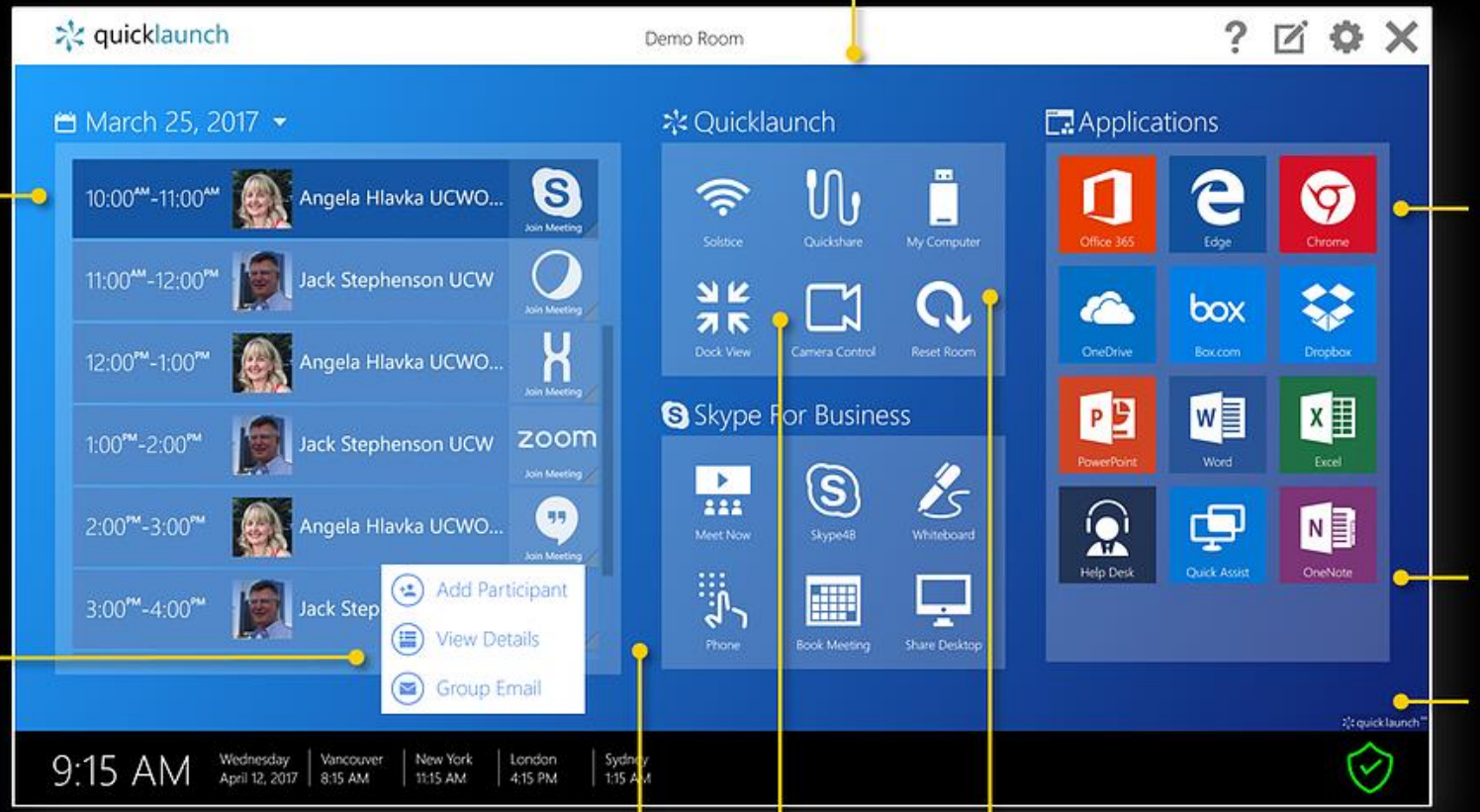
Flexible and open
Configuration can be complex
UI can be complex

quicklaunch

Share

Wireless Share * Wired HDMI Device Sharing**

Easy File, RDP, USB Access
VDI, ICA and more



Meet

One Click Join
Or Adhoc

Exchange or
Google Calendar

Collaborate

Whiteboard
Start Applications
Launch Websites
Play Videos
Access Data
and Content

Manage

Customizable
Helpdesk Tiles

System Status
Notifications

UE - Email Out to Participants, Add Participants, View Details (optional)

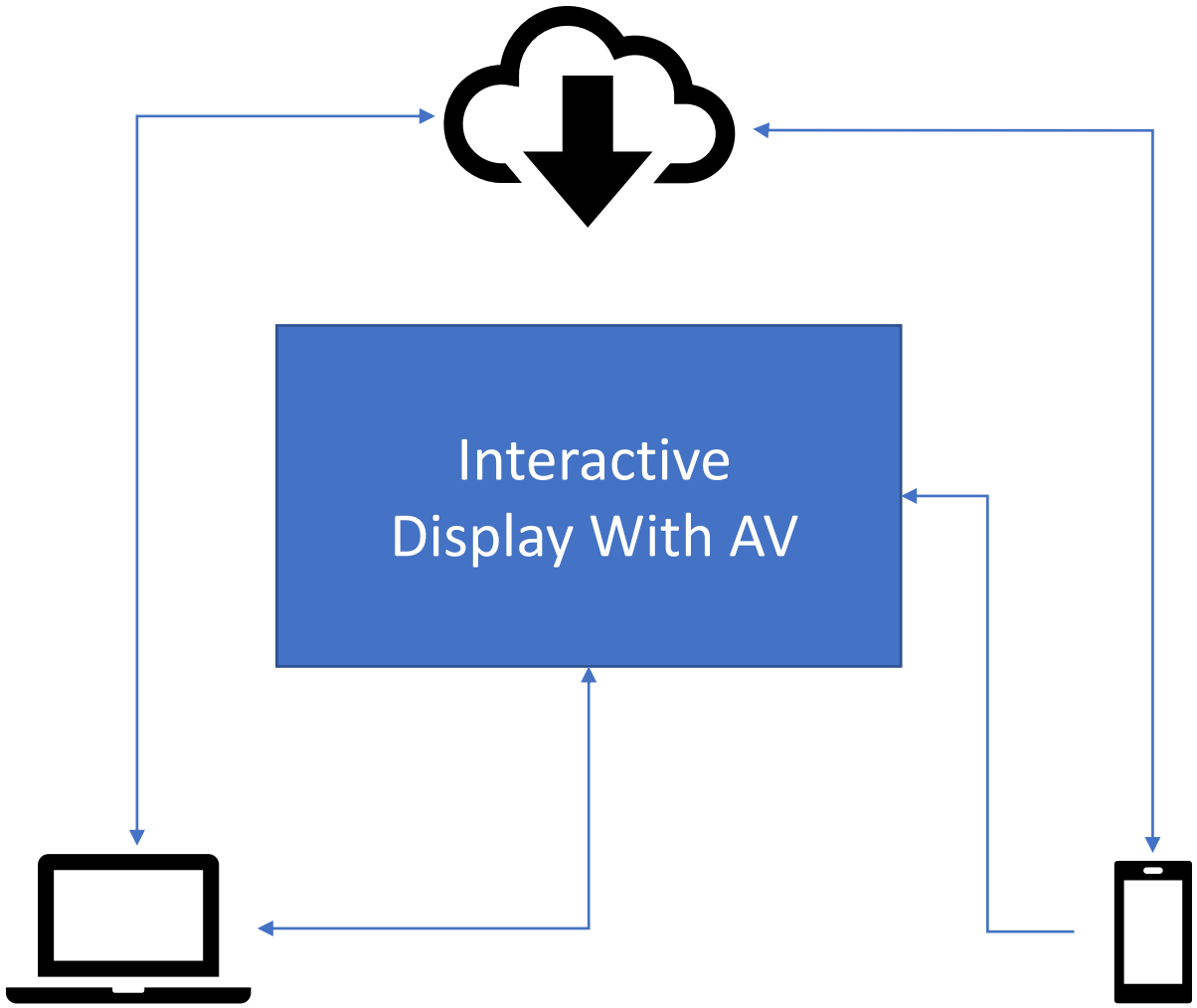
UE - Skype For Business Integration
Meet Now, Whiteboard, Dial, Book Meetings, ...

Camera Control

Securely End Meeting
(Automated and/or By Button)

* Requires 3rd Party Sharing Application
** Requires USB Capture Device

Accessory Model



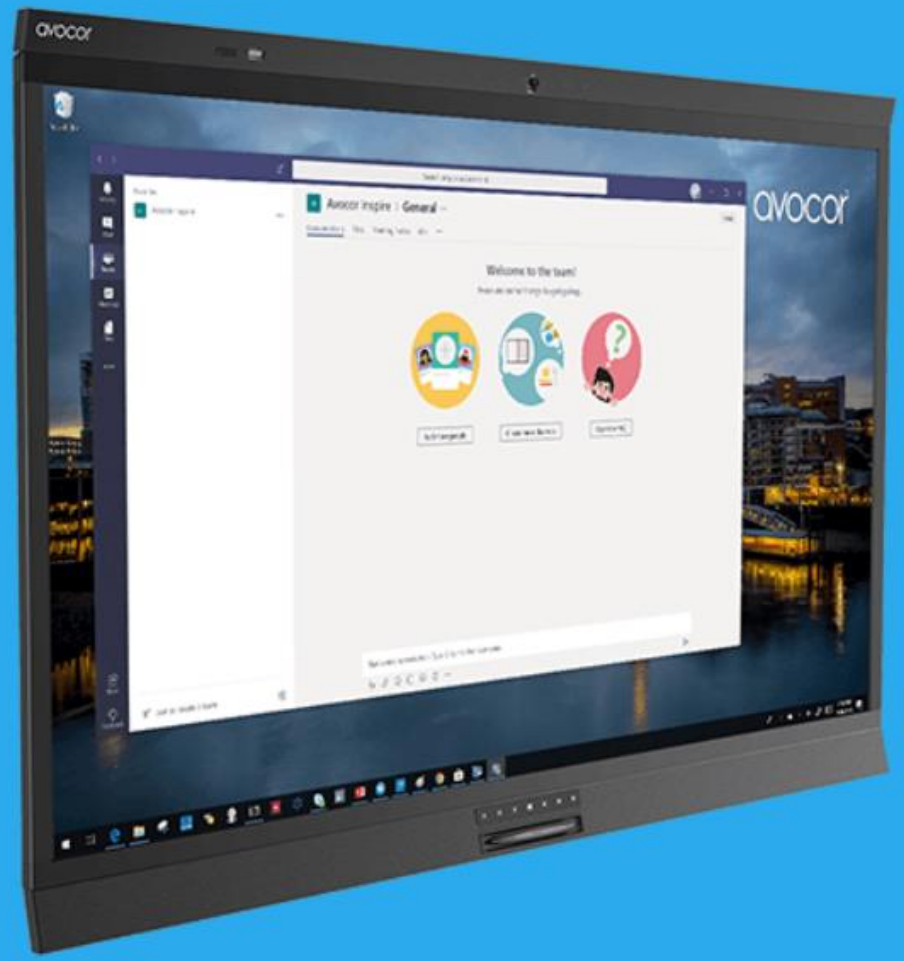
Pros

- Simple, familiar projector use-model
- High guest security
- Meeting control accomplished through meeting host’s device
- Simple device to manage (little or no compute)
- Low local whiteboard interaction latency, if cabled

Cons

- Cables
- Type C connection required for best experience
- Limited functionality when no PC/tablet is connected
- Host’s personal device may be tied up during meeting
- Guests need internet access to share screen remotely
- No intrinsic public display of room schedule

Windows Collaboration Displays



"The new Windows collaboration displays by Avocor will make teamwork easier and more efficient by making it possible for people to extend their PC experience and applications like Microsoft PowerPoint, Teams and Whiteboard to a large interactive display that has been designed from the onset to be fully compatible and easy to use."

Ruston Panabaker, Vice President IoT Solutions - Microsoft

What Model is Best?

- Both Appliance and Accessory models have merits and handle presentation and discussion meetings well
- Ideation meetings somewhat problematic for both
- Choice depends on budget, security requirements, frequency of ad hoc ideation meetings



Ideation Content Management

Location of Content To be Contributed

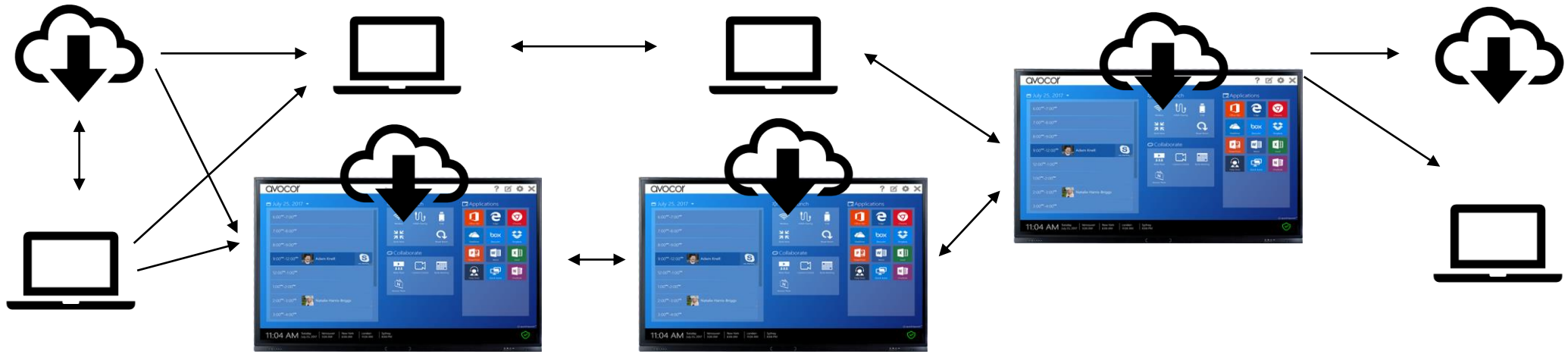
Authentication Device

Navigation/Selection/ Control Device

Ideation Device and Canvas Cloud Store

Capture Location

Team or Personal Store



Need biometric sensor
Need multiuser support
Pre-register for best experience

Ingredients for “Low Friction” Ideation Meetings

- Ideation platform (cloud hosted whiteboards)
- Integration of ideation platform with UC platform
- Personal device companion app/OS for auth, navigation, control, claiming
- Automatic smart pairing of personal device with public interactive display (e.g. acoustic, BLE), especially for ad hoc meeting
- Optional: Team-owned devices with biometric sensors or RFID

Whiteboarding

Analog Whiteboards Are Still Around! Why?





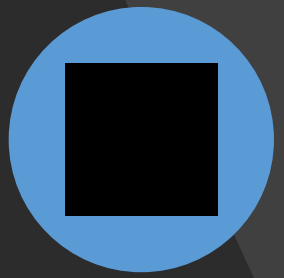
CHEAP



SIMPLE, IMMEDIATE (ONE CLICK IS TOO MUCH)



DOESN’T INTERFERE WITH VIDEOCONFERENCING AND PRESENTATION



GOING DIGITAL DOESN’T HELP THAT MUCH…SO FAR

Dedicated Interactive Display for Whiteboarding



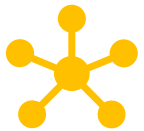
Digital Ideation Hardware and Software Ingredients



More standardized pen interface (e.g. erase)



Cloud-hosted, cross-device



Integrated across UC platforms



Low latency architecture



Simultaneous pen and touch capability



Ink Intelligence

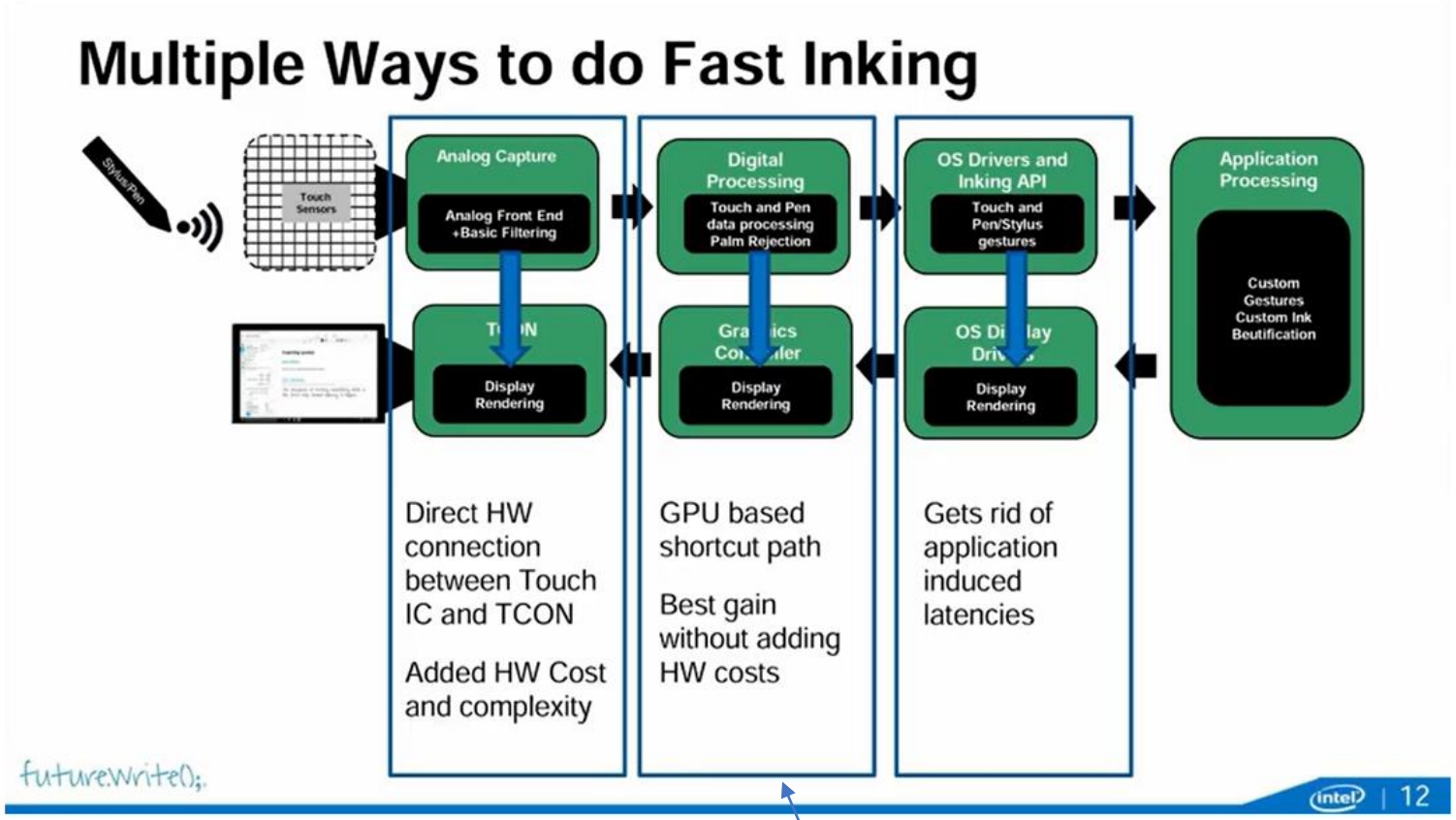


Paul Dietz, Microsoft Applied Sciences Group, 2012

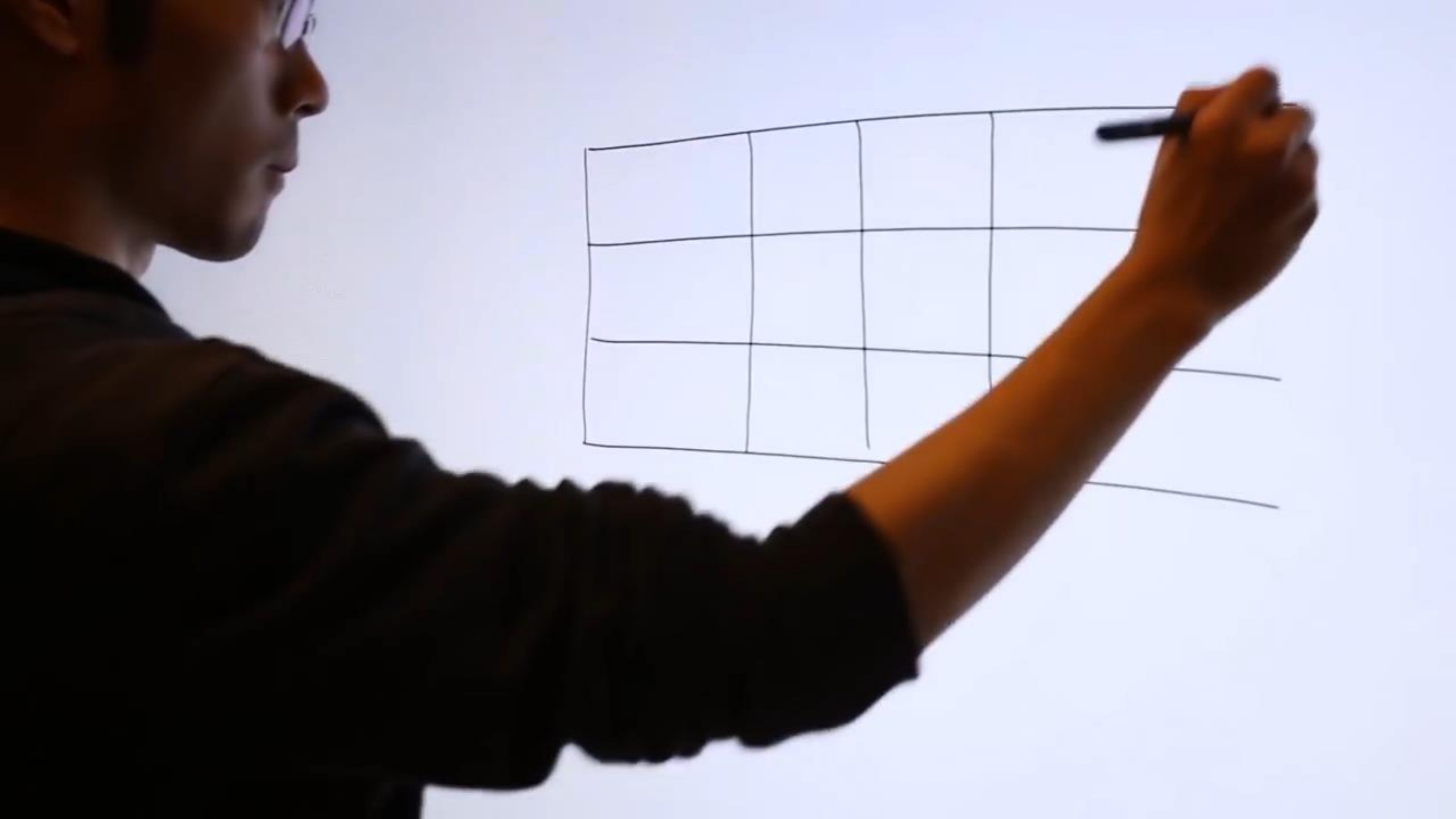
Reducing Ink Latency

Arvind Kumar, Intel, Future.Write() 2018

https://www.youtube.com/watch?v=waL94FsM4vI



Intel Precise Touch and Stylus approach



Microsoft Research, WritLarge project, 2017

Bill Buxton, Ken Hinckley, Michel Pahud

FluidMath

Math Pen 2 | Draw Pen | Clear Page | Draw ink with touch | Rewind | Run | 0 To 10 | More | Help | FLUID MATH

AV (Cameras, Mics and Speakers)

Typical IFP Camera Configuration











Double Robotics iPad
Telepresence Robot



Polycom RealPresence Centro

In-Room Representation (Getting a Seat at The Table)

Lifesize Image

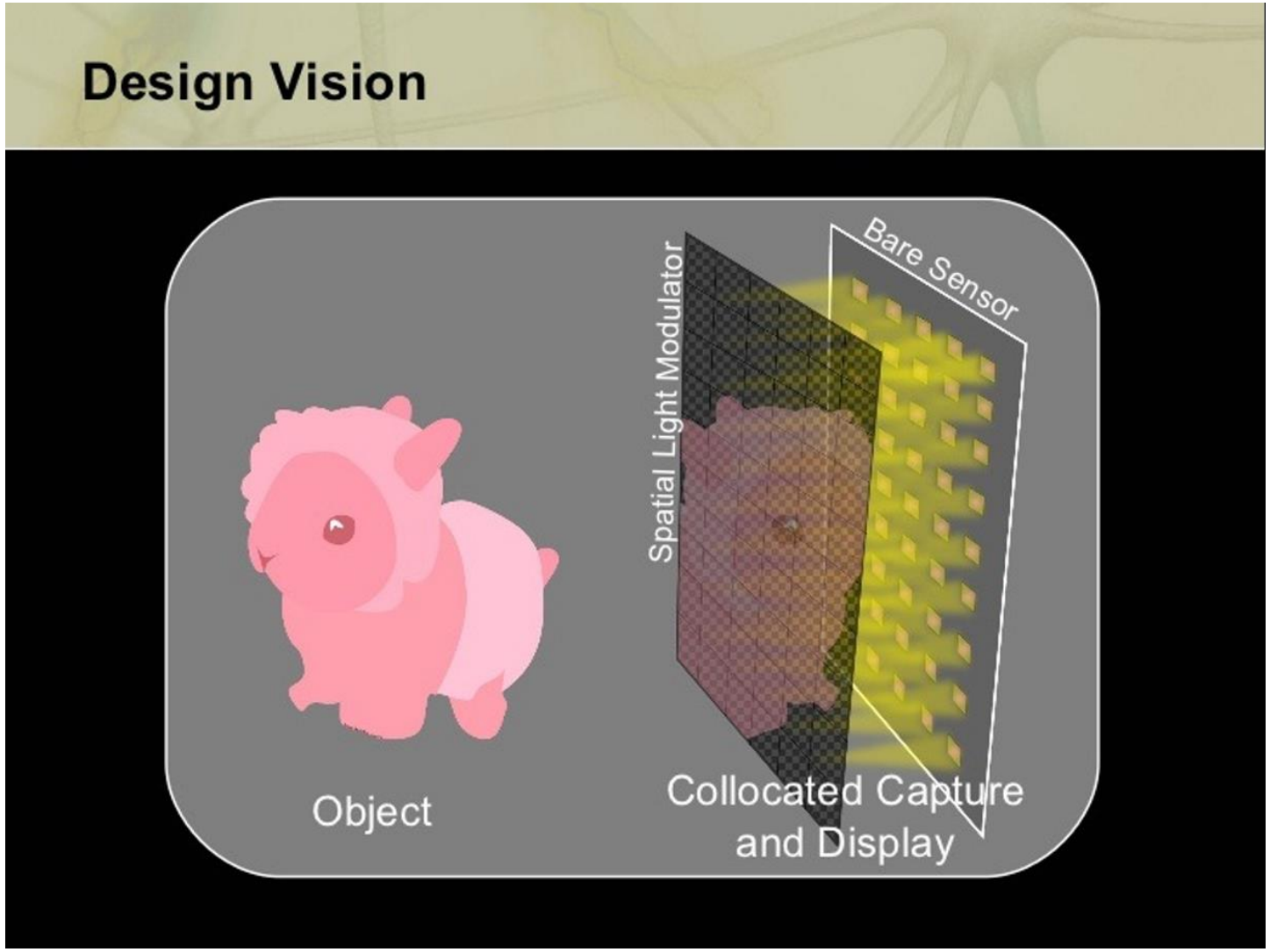
Microsoft Surface Hub 2



Meeting Owl



BiDi Screen: SIGGRAPH Asia 2009, MIT: Hirsch, Lanman, Holtzman, Raskar

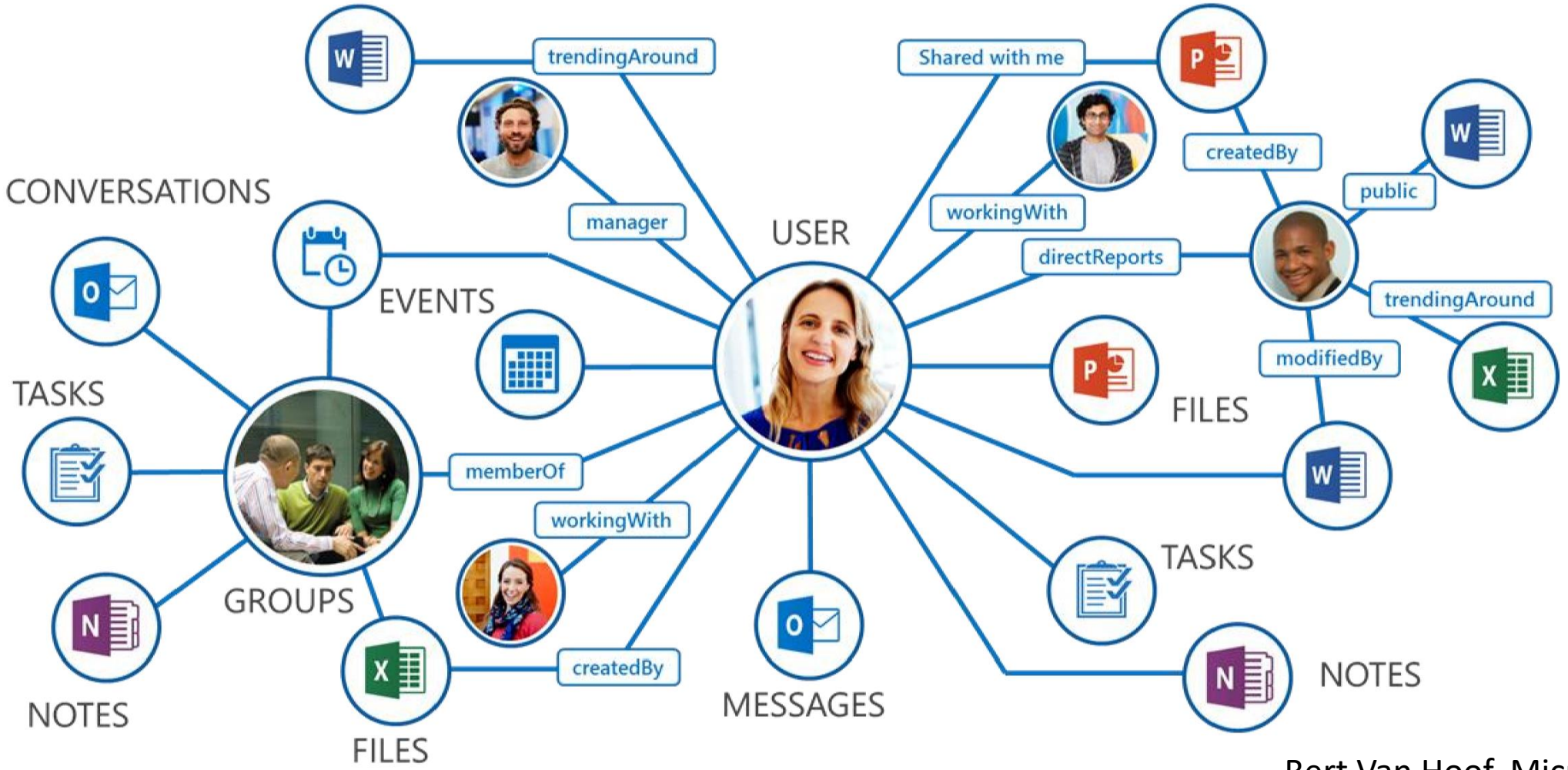


Meeting Intelligence

From Data to Helpful Actions

Sensor input	Sensor and data fusion	Actions
• Environment: temperature, lighting, air quality, noise, • Context: location, time, people count, posture, devices, participant identity, remote people, language, whiteboard usage • Content: speech, touch, ink	• Calendar • Team identity • Documents used • Content history	• Offer documents, search for and display needed information • Translate • Offer food/drink • Adjust lighting, air refresh • Suggest tools for ideating, organizing • Auto-generate and distribute summary and action item list • Record and transcribe

DATA OPPORTUNITY – MICROSOFT GRAPH



Bert Van Hoof, Microsoft
http://graph.microsoft.com

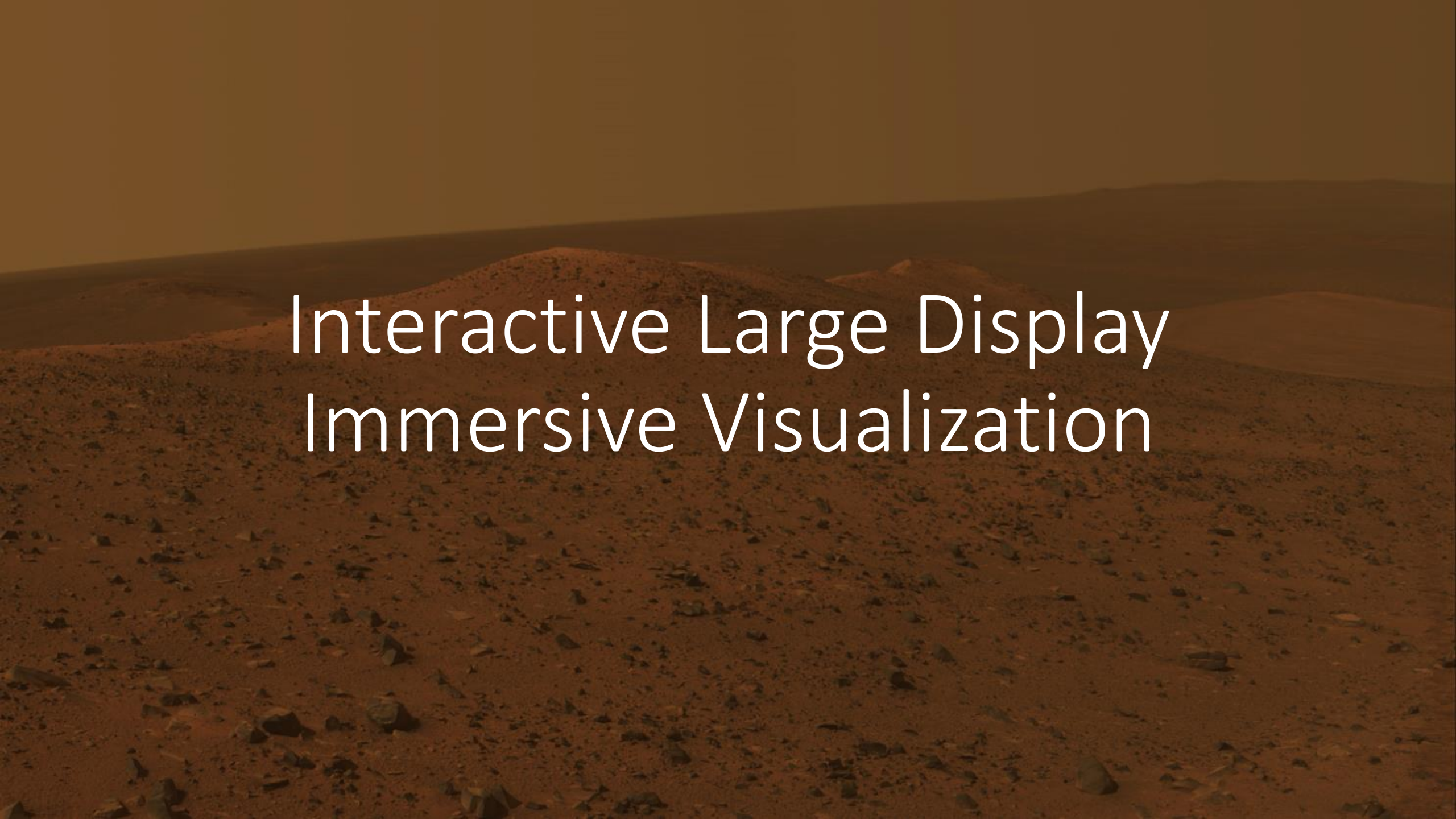
Why IoT Meeting Space Sensing in Large Interactive Displays?

Trend is at least one display per meeting space; already networked and powered (no separate sensor install required)

Displays are going mobile in reconfigurable and open workspaces

Displays are where teams do their work

Embedded edge processing provides responsiveness, capability and security


Interactive Large Display
Immersive Visualization

Benefits of Interactive Immersive Visualization



Save time and money:

- Speed up tasks
- Save on travel



More effective learning, training and exploration

- Experiential learning in safe environment
- Comprehension of complex data and spatial relationships



Enhanced situational awareness and remote control



Enhanced human connection

VR vs. Large Interactive Display





	Wearable VR	**Large Interactive Display**
HFOV	110 degrees	130 degrees (88" display at 18")
Resolution	2560x1440	7680 x 4320 (8K)
Stereo 3D	Yes	No
Control	Hand-held remote	Screen: precise, multimodal (touch/pen)
Social	No	Yes
Comfort	Poor	Excellent
Simulator sickness	High	Low-Medium

The Challenge is Suitable Interactive Content

Content currently optimized for small screen devices, single touch and mouse

- Large interactive display install base is too small to drive development of optimal interactive content from vertical market apps
- Web content optimized for smaller screens

Low latency, graphically rich multitouch and pen interactive apps difficult to develop

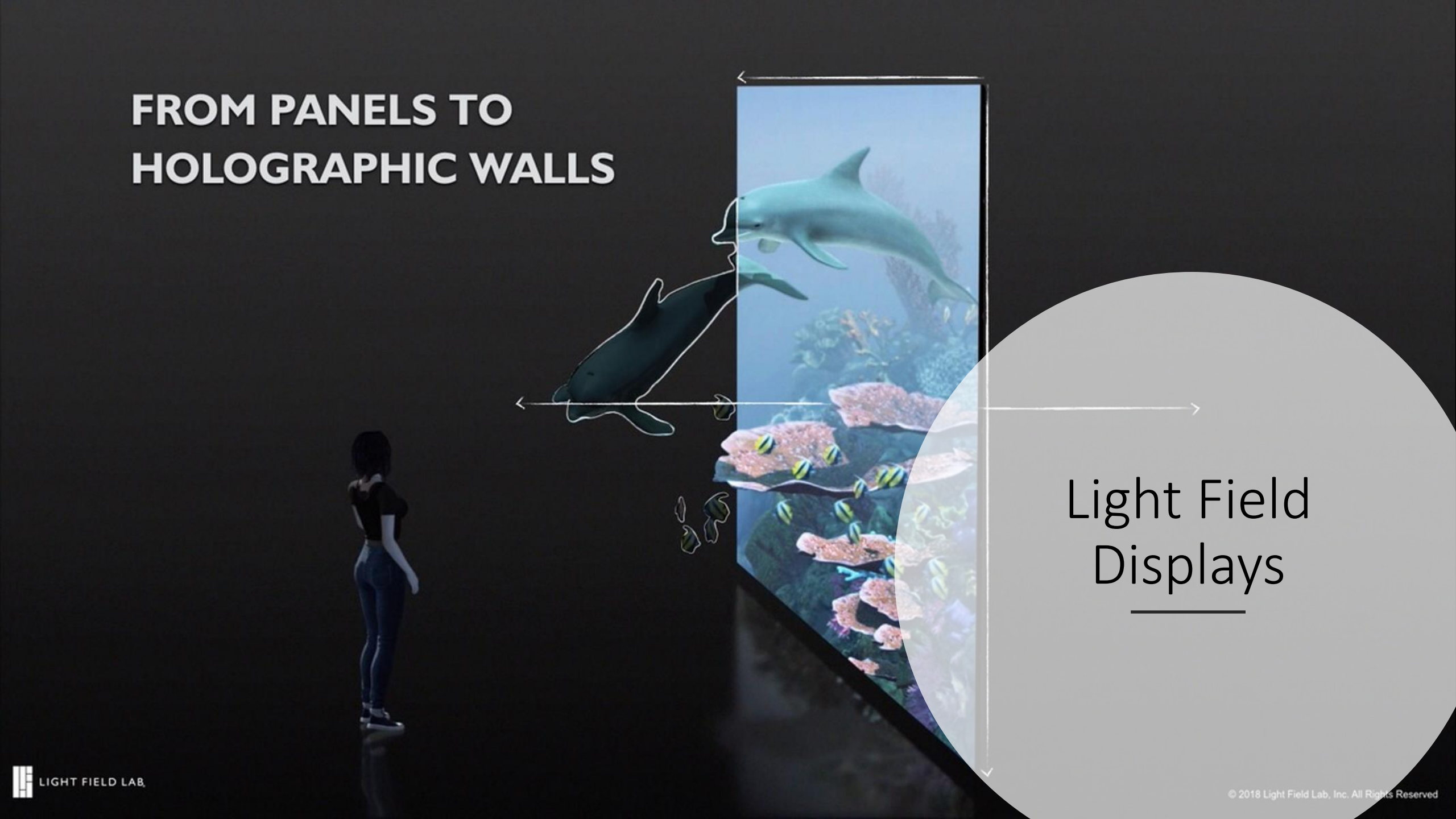
VR/MR 3D content is still limited, mostly demo content and tools not available to “flatten”



Microsoft HoloLens







Light Field Displays

© 2018 Light Field Lab, Inc. All Rights Reserved

Summary: Further innovation is needed to realize productivity benefits of interactive displays



Low friction ideation meetings through UC integration, biometric sensors, device pairing



Integrated intelligent whiteboarding platforms and dedicated interactive displays for whiteboarding



Reinvented AV to enhance remote participation



Workspace sensing and platforms for data fusion and intelligent action



Optimized hardware and interactive content for immersive experiences

Thank You!

