White Paper

The Digitization of Work

A Structured Approach to Transforming the Workforce Experience

Part 2

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Contents

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Introduction

This is the second of a two-part series of white papers designed to help business leaders better understand the topics associated with the **Digitization of Work** – the application of advanced technologies to connect people, spaces, and things with business processes in order to enhance productivity, drive innovation, engage the workforce, and reduce costs. It builds on concepts from Part I, introducing a structured method for strategy and planning of the workforce and workplace transformation. Included is a model to help understand the seven basic needs of the workforce; tools to identify the various requirements, intersections, and dependencies of proposed solutions; and a comprehensive reference architecture to help establish a common strategic framework for digital work initiatives.

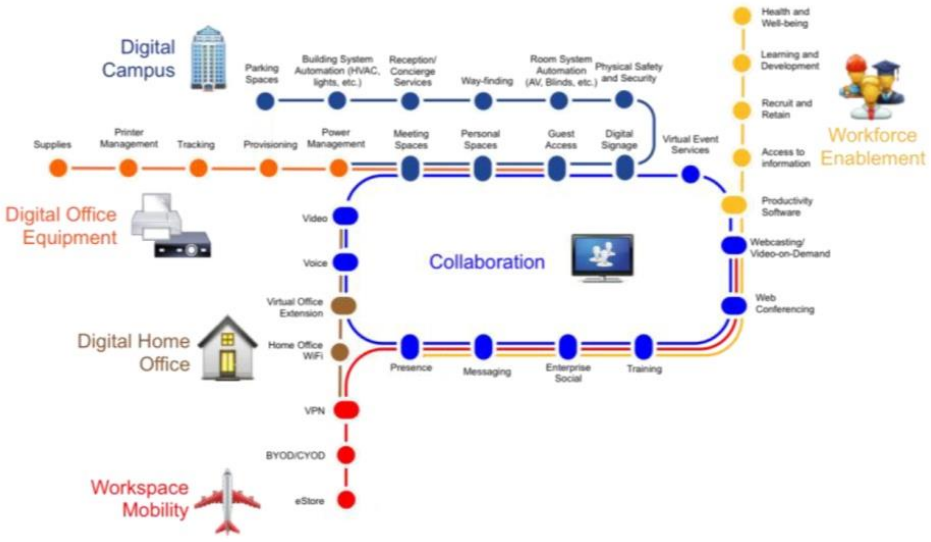
Part I provided an overview of the transformational trends; identified business drivers; and introduced new models to help define the scope of the opportunity, and to begin to understand the interrelationships between various solutions. While this paper briefly reiterates some of those concepts, it is recommended to read the first part before continuing with this one.

Overview

As mentioned in Part I of this series on the Digitization of Work, the disruptive trends associated with Digital Business Transformation are critical considerations for business leaders in all parts of the organization.[1] Ignoring or misjudging the steady stream of technological advances associated with areas such as mobility, collaboration, security, and the Internet of Things (IoT) will cause the failure of four in ten businesses in the next few years.[2] And while much of the current focus is on specialized business processes associated with manufacturing, logistics, healthcare, and other verticals, there is a tremendous, untapped opportunity associated with the workforce itself.

As shown in the Cisco® Digital Work Landscape (see Figure 1), this digital transformation of the workforce – initially for knowledge workers, but ultimately extending to everyone in the organization – is an area ripe with opportunity. In fact, from the worker's perspective many of the listed solutions are simply an effort to catch up with the tools, techniques, and environments they use in their personal lives to perform everyday tasks – simple activities like making reservations, sharing information, and communicating with friends.

Figure 1. Digital Work Landscape



This technological dissonance between the worker's activities at home and at work is growing rapidly. The traditional workday approach is no longer practical for many and soon to be most, workers. Workday frustrations are driving down workforce engagement and thereby impacting productivity, quality, innovation, and effectiveness. Changes in the workforce experience are a requirement for reversing that trend, as well as for the recruitment, retention, and engagement of top talent. These powerful and often disruptive changes are not restricted to the workplace, or just to the workforce. Instead, they cross the boundaries of work, home, and travel; and they impact employees, contractors, partners, customers, and more. The undertaking to solve these problems – the Digitization of Work – will fundamentally change the way people think about work and enable them to better integrate it into their daily lives.[3] This is the opportunity to help your employees shift from a struggle for a work-life balance to a creation of a work-life rhythm.

This is the opportunity to help your employees shift from a struggle for a work-life balance to a creation of a work-life rhythm.

Cisco Services has developed this approach to the Digitization of Work to provide a comprehensive framework for these transformative opportunities and solutions. Included in this methodology are Cisco's Digital Work Landscape, Digital Work Framework and Digital Work Reference Architecture, all of which are covered in this two-part white paper. Taken together, these tools can serve as a guide for any organization that is eager to begin the work of best utilizing the use of collaboration technologies, mobile and location-aware applications, enterprise social, analytics, and IoT solutions throughout the workforce experience.

Reference Framework – Part 2

The Digital Work Landscape from Part I of this white paper series showed an exciting array of opportunities and solutions for enhancing the workforce experience. But different organizations have different needs. For example, companies that have a culture or a policy of "work-from-work" and discourage or prohibit "work-from-home" are unlikely to focus on Digital Home Office opportunities. Even within an organization, there will be a fluctuation of needs across different departments, roles, geographies, and worker personas. Determining and prioritizing solutions will be challenging.

In addition, the growing ambiguity of both the **workforce** and the **workplace** requires tools that can help identify the opportunities, plan an approach, and prioritize the right solutions for a given organization. Without this level of planning, solutions will suffer from poor usability, challenges in system interoperability, security vulnerabilities, and ultimately, low user adoption. Creating this strategy requires a structured approach.

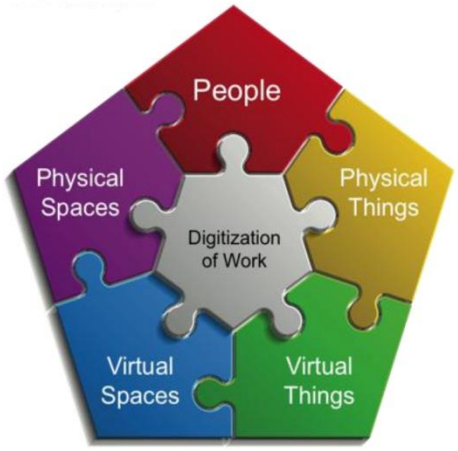
To assist with this, Cisco Services has developed the Digital Reference Framework and Reference Architecture that helps define the scope, and also establishes the connection to business outcomes; provides a means to visualize the interconnections; facilitates prioritization of the various solutions; and helps to understand the costs and benefits. This starts by understanding the four tiers of the framework:

- Actors – Five key participants in the workforce experience
- Needs – The **actors'** seven key requirements for success
- Capabilities – The three to five basic solutions that satisfy the **needs**
- Enablers – The various tools, processes, and capabilities associated with each of the **capabilities**

The actors tier (see Figure 2) was discussed in Part I of the white paper. To briefly review, the actors are **who**, or in many cases **what**, are the key participants in a workforce experience function. In other words, what resources, human or otherwise, are involved in a successful solution. The actors include:

- People – traditional employees, contractors, interns, partners, and even customers or competitors (in special circumstances).
- Physical spaces – dedicated offices or cubicles, flexible spaces, open collaboration space, social space, public space (for example, lobbies) and more. This also includes home offices.
- Virtual spaces – collaboration tools that connect workers over time and distance, such as video conferencing, web conferencing, enterprise social tools, persistent chat, etc.
- Physical things – various equipment used by workers, including furniture, computing equipment, supplies, and more. The IoT creates a near-term potential for these items to begin "waking up".
- Virtual things – online documents, large enterprise systems, mobile apps, databases, and other stored electronic information.

Figure 2. The Five Actors of Digital Work



Each of the five actors is interconnected with each of the others. Major opportunities can typically be found where they intersect.

The needs and capabilities tiers are described in the next section. Examples from the fourth tier, enablers, while occasionally cited, are generally beyond the scope of this white paper and will be discussed in subsequent publications or in more detailed discussions with Cisco workforce experience advisors.

Needs – Seven Basic Needs for Effective Working

In some ways, the Digitization of Work touches every work-related activity (and also some personal ones) that happens during the worker's day, from the time the worker wakes in the morning and grabs the smartphone on the bedside table to check for messages and appointments, until the last video conference late in the evening with a customer ten time zones away. This is increasingly relevant with the movement towards flexible working hours and a blurring of the lines between work and personal life. But attempting to consider **everything** when evaluating a strategy for digital work can be overwhelming and ultimately, unsuccessful. Additional structure is needed to help organize these myriad activities.

Examination of the activities in a typical day for a knowledge worker shows that work can be divided into sets of activities that are common across roles. This includes activities such as finding and gathering resources, meeting, communicating, interacting with computing equipment, measuring and assessing outcomes, etc. The worker has requirements – typically consisting of tools, processes, and capabilities – to help accomplish these tasks with maximum efficiency and effectiveness. These requirements can be sorted into the seven essential **needs** that must be provided by the organization in order to achieve the best effectiveness and efficiency from the workforce (see Figure 3). Interestingly, each of these seven needs is critical, not only to the workers (people), but also to each of other four actor groups. Understanding the requirements of each actor as it aligns with each of the defined needs is a key factor in a digital work strategy. A holistic, coordinated strategy is difficult, if not impossible, without this type of assessment.

The seven basic needs are described below with some examples of key supporting capabilities.

- **Identify, Catalog – Capture, manage and dispense specific information about people, spaces, and things. This information can be from the past, present, or future.**

  Studies show that an inordinate percentage of the typical workday is spent simply trying to find information about people, spaces, and things.[4] This is largely due to poorly structured and managed catalogs and directories. Nearly every organization has multiple, redundant, and disconnected repositories even for the most basic information, such as employee data. Improving the methods for capture, storage, management, and delivery of up-to-date information about these assets will yield significant results. Exemplary organizations use contextual information (role, location, status, etc.) to improve results.[5] Key capabilities include the coordination and management of:

- Directories and catalogs – basic lists of information about the actors. For people, this is likely a Lightweight Directory Access Protocol (LDAP) system such as Microsoft Active Directory, but most organizations also have multiple separate repositories such as a phone number directory, human resources management (HRM) system, and more.
- Profile information – detailed information about the actors. For example, a profile may be maintained about a physical space that indicates the building and floor; how many people it will hold; and the kinds of audio and video equipment available. For people profiles, it includes information such as areas of expertise. These are typically uncoordinated across various systems.
- Current and future status or state – information about the actors' state or status. People might be identified as "in a meeting", "available", or "away". A physical space might be "reserved" or "available" for a specific time in the future.
- Maps – information showing physical or virtual positions in relation to other actors. Maps can include campus or building drawings, organograms (maps of organizations), data models, etc.

Figure 3. Seven Essential Needs of Digital Work

- **Assign, Allocate – Enable simple means to find and obtain the necessary people, spaces, and things and to assign roles, responsibilities and status.**

  Even when an organization's resources are properly cataloged, accessing that resource can be difficult. Common tasks, such adding a subject matter expert to a project, reserving a meeting room, or gaining access to key sales data, can be frustrating and often tedious. Workers today expect simple, efficient means for acquiring the people, spaces and things they need to do their jobs. Then they need to be able to easily assign proper roles, responsibilities, and status. Key capabilities include:

  - Search, recommend – building on the **catalog/identify** need, this includes specialized search features as well as content filtering and contextual recommendation functions.
  - Procure – the means for workers to obtain or generate **new** assets or resources needed for their roles. This could include worker requisitions, equipment procurement processes, access to enterprise applications, or data storage requests.
  - Reserve – the ability to schedule a resource such as a person or a hot-desk space and then ensure the resource is properly indicated as "in use". An example associated with virtual things would be the ability to "lock" an online document to prevent conflicting updates.

- **Equip, Enable – Provide necessary equipment, functionality, or information to enable people, spaces, and things to succeed.**

  There are a certain capabilities that are simply expected in the work environment. A conference room must have a conference phone (at a minimum); a knowledge worker must have a computer (again, at a minimum); a salesperson must have access to the Customer Resource Management (CRM) system; a virtual meeting with customers must have the technology to include attendees from outside of the organization. But these capabilities do not occur spontaneously. Processes and tools must be in place to ensure proactive, timely, and efficient provisioning of these key resources. Key capabilities include:

  - Network access – permission and access to various telecommunications and data networks for transfer of voice, video, and data; both inside and outside of the organization.

- Information access – permission and access to applications and data. This includes the ability for applications to integrate with one another.
- Equipment allocation – provisioning, management, and renewal of physical equipment for people and physical spaces. Interestingly, even virtual spaces will occasionally require equipment such as cameras, lighting, and microphones to enable a virtual town hall meeting.
- Asset delivery – transportation of people and things to desired locations. This could include supplies, loaner equipment, and software applications for mobile devices.

- **Connect, Interact – Establish efficient and effective interfaces between people, spaces, and things.**

  As mentioned in Part I of this white paper, collaboration is the backbone of the workforce experience. Collaboration at its core is simply the way that people **connect** or **interact** with people in order to achieve a common goal. But the intersections of people with spaces, people with things, and even spaces with things are also critical in the new ways of working. It is important to find ways to deliver effective, simple, and intuitive interfaces between these actors to generate high levels of productivity. The use of contextual cues can be valuable in streamlining activities. Key capabilities include:

  - Collaborate, participate – interaction between actors. The most obvious example is people-to-people collaboration. It also includes the frequent interaction between people and things; often through a keyboard or other input device.
  - Configure, personalize – communication and storage of preferences regarding the way a space or thing behaves in specific situations. Lighting, heating, and telecommunications preferences might be saved and automatically set when reserving a hot-desk space. Computers, phones, and applications are often configured to the user's preferences.
  - Assist, moderate – reaction to, or prevention of, problems or issues. Examples include contact centers, voice response systems, "white glove" concierge services for virtual meetings, automated self-help systems, etc.
  - Notify, communicate – unlike collaboration, this is typically a one-way communication. Digital signage, status indicators on printers, video-on-demand (VoD) services, and intercom systems are all good examples.
  - Guide and direct – real-time assistance in finding important resources. Examples include building navigation (wayfinding), "smart" emergency exit lighting, and online site maps.

- **Monitor, Evaluate – Measure and analyze key success indicators to enhance performance and to prevent or detect issues associated with people, spaces, and things.**

  "If you can't measure something, you can't understand it. If you can't understand it, you can't control it. If you can't control it, you can't improve it."[6] The enterprise, its workers, and its other assets require feedback in order to grow and improve. All too often this information is difficult to capture, find, and understand. This problem will grow exponentially with the advent of the IoT and the immense amounts of data that will be coming from millions of connected devices. Organizations must focus on identifying and prioritizing which things should be measured and then determine the best approach to analyze the data to provide logical responses. Key capabilities include:

  - Assess utilization – collection and analysis of the actual usage of resource as opposed to how often it is assigned. Large meeting rooms, for example, are frequently reserved but only used by a single person, or even left empty. This capability applies equally well to all five actors.

- Assess participation – collection and analysis of the level of interactivity. This is a key indicator of adoption of technology and its features.[1]
- Assess performance – collection and analysis of the actual versus desired behavior of an actor.
- Detect problem or fault – proactively identify the potential for, or the occurrence of an error, malfunction, outage, or other sub-standard level of performance.

- **Nurture, Maintain – Enable the necessary short- and long-term support of people, spaces, and things to effect successful outcomes.**

  While an organization **maintains** spaces and things, it **nurtures** people. But the idea is essentially the same. In order to receive maximum value from resources, it is essential to put proper effort into motivation (for people), improvement, enhancement, and repair. This need often builds on the **monitor/evaluate** need described earlier, but should also be a proactive endeavor. Analysis of data will identify areas for improvement, needs for repair or replacement, or other opportunities. Changing needs of the organization frequently drives Nurturing/Maintenance actions. For example, if a shift in the market creates a new need for a certain skill, specialized training programs might be implemented to develop existing staff. Key capabilities include:

  - Reward – the balanced array of motivators that inspire people to high levels of performance. Studies show that people are motivated by a combination of extrinsic (salary, bonus) and intrinsic (praise, altruism) rewards.[7] This capability is exclusive to people.
  - Maintain, supply – ongoing provision of basic needs to sustain the actors. Examples include health and wellness services for workers, paper and ink for printers, and software patches for applications.
  - Train, develop, enhance – improvement or augmentation of the actors. Examples include training and development for employees, hardware upgrades, and new software features.
  - Repair, remedy – reaction to a known or anticipated problem. Troubleshooting activities, equipment repairs, and "swap out" services are all good examples.

- **Secure, Protect – Provide for the physical and virtual safety and welfare of people, spaces, and things.**

  Threats or attacks on workers, physical assets, data, and intellectual property are common occurrences in today's society. The worker's perception of their environment will have a direct impact on their productivity. Fear for their own safety or for their work product will certainly have a demotivating effect, leading to poor engagement, low attendance, and loss of key talent.[8] In addition, actual losses from physical and virtual theft can be measured in billions of dollars each year. New technologies are offering a wide array of preventive and reactive measures for reducing loss and mitigating damage. Key capabilities include:

  - Badge, authenticate – proof of authenticity for an actor. Workers typically have identification badges, but biometrics is becoming commonplace as a more reliable source. Software and network-connected hardware require confirmation to reduce information security vulnerabilities.
  - Authorize – approve access for use or entry. Most campuses have buildings or areas that are restricted to certain personnel. In the same way, virtual spaces and things are frequently restricted to workers or other applications on a "need only" basis.

[1] "Cisco Connected Analytics for Collaboration," Cisco, http://www.cisco.com/c/en/us/products/analytics-automation-software/connected-analytics-collaboration/index.html.

- Adverse event detection and reaction – similar to the **detect problem or fault capability**, this capability is focused on major events that can cause loss of life or property. Examples include external events, such as severe weather or an earthquake; internal events, such as fire or toxin; and other major incidents.
- Monitor, safeguard – proactive measures intended to prevent or mitigate adverse events. This includes security cameras, campus 911 services, gunshot and glass breakage sensors, emergency routing, and more.
- Regulatory compliance – measures taken to ensure that laws and regulations set by governing bodies are understood, obeyed, and recorded.

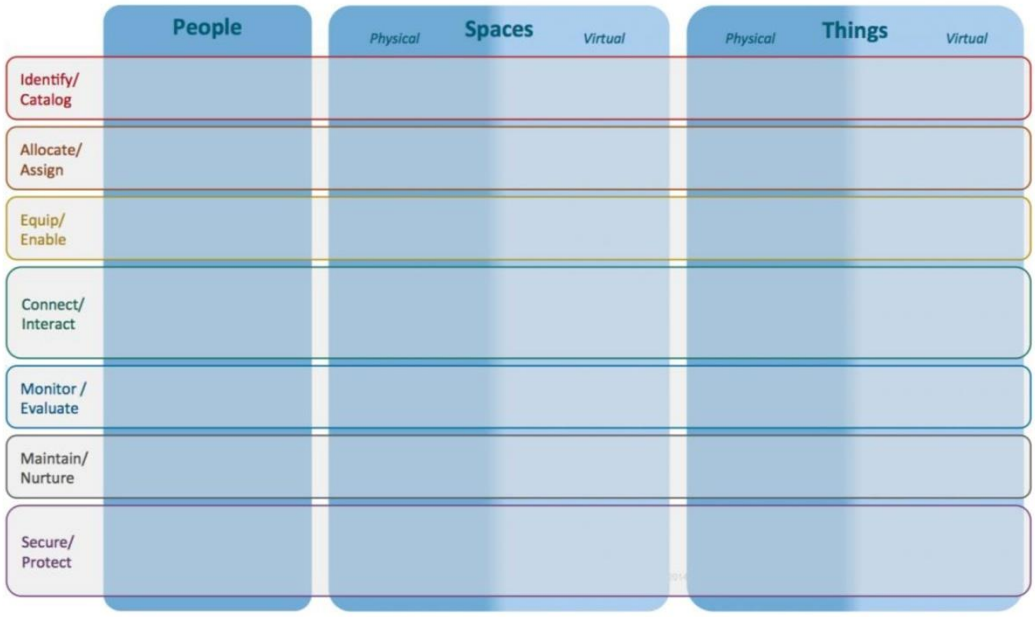
Reference Framework Tools

There is little doubt that development of a holistic strategy for the Digitization of Work is a complex undertaking. Identification of actors and needs, plus examples of supporting capabilities, can help in considering the various factors, but additional tools are needed for consideration of the many intersections and dependencies and to ultimately determine a solution set. The Digital Work Reference Framework Matrix and the Digital Work Reference Architecture Model will help in these exercises.

Reference Framework Matrix

The Reference Framework Matrix (Figure 4) is a simple concept that encourages detailed deliberation across all of the actors and needs. It works well in "sticky note" type sessions[2] with a diverse team of subject matter experts (SMEs) focused on a specific goal or outcome. The SMEs should address each cell, using the capabilities described above as guidance, in order to identify all of the requirements, ideas, concerns, gaps, etc. pertaining to that cell.

Figure 4. Digital Work Reference Framework Matrix



[2] A common meeting facilitation technique. For general examples see "Post-it Collaboration Central," 3M, http://www.post-it.com/3M/en_US/post-it/ideas/collaborate/?WT.mc_id=www.Post-it.com/Collaborate.

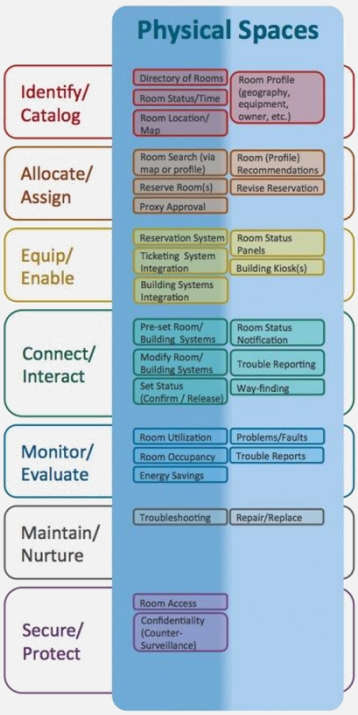
The following example illustrates how senior leaders in a facilities team might use the tool with a group of key stakeholders to address a meeting room shortage.

Example: Workers are complaining that they cannot find available meeting rooms, especially video conferencing rooms. The rooms in question are a mix of standard rooms and rooms with video conferencing equipment. The rooms are often empty, even when they are shown as “booked” in the existing room reservation system. In other cases, only one or two people occupy large rooms. There is currently no good way to know how often the equipment is being utilized in the video conferencing rooms, and there is strong evidence that the rooms are often being used for simple face-to-face meetings, leaving valuable video conferencing tools idle.

After some investigation, the leaders conclude that they need to better understand the business requirements and the desired outcomes. They start with the physical spaces column of the Reference Framework Matrix (Figure 5). This reveals several key features that they feel are essential to a successful solution.

- Context-aware room recommendations (number of people, geography, equipment, etc.)
- Visible indicators outside each room showing current and future status
- Integration into room and building systems to automate lighting, AV equipment, and blinds
- Building navigation (wayfinding) to allow people to find rooms more easily
- Reservation capabilities from within familiar tools (email, web portal) and from mobile apps and kiosks
- Automated monitoring and reporting of room utilization and occupancy

Figure 5. Initial Evaluation for Meeting Room Dilemma

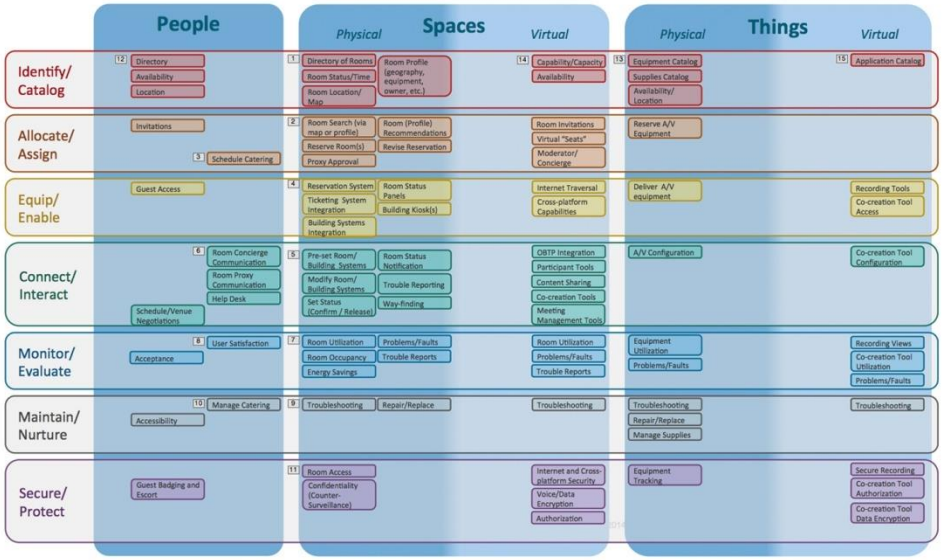


However, further assessment using the other four columns in the matrix shows that other actors have key roles in the overall experience and must be given equal consideration (see Figure 6 for details).

- Since **people** are the key part of any meeting, a review of this column is important. The ensuing discussion reveals that integrating people and physical spaces into a single context-sensitive reservation and invitation process would considerably reduce complexity and frustration. Additional people-oriented capabilities include options for guest access, catering, and management of proxy-controlled meeting rooms.
- Like people, **physical things** are also a part of most meetings that require a physical space. These might include office supplies (flip charts, markers, pens, etc.) or presentation equipment (projector, electronic whiteboard). Ideally, the process for procuring these items should be integrated. Other opportunities include a simple capacity for troubleshooting equipment and for replenishing supplies during a meeting.
- Someone points out that a large percentage of all meetings now include remote attendees. This means that **virtual spaces** must also be considered. Coordinating the physical meeting rooms across multiple locations with tools to enable virtual sharing of voice, video, and presentation materials will be very challenging if they are not well integrated. This will be especially true when some of the attendees are from outside of the organization and may not be accustomed to the tools. The exercise also uncovers the need for professional moderation and troubleshooting during large or important meetings. And, perhaps most importantly, security issues for different kinds of meetings are discussed in some detail.
- Finally, the use of virtual spaces entails the use of **virtual things**. Recording a virtual meeting can happen in various ways, depending on the tools used. Editing, annotating, and transcribing those recordings will require appropriate software tools. In highly collaborative meetings, the participants will want co-creation tools (virtual whiteboard, co-editing tools, etc.) and will want the participation of remote attendees. Security is once again a key concern.

The final outcome is shown in Figure 6. The team acknowledges that this is a much bigger project than they anticipated and agree to another workshop to break out and prioritize the various projects.

Figure 6. Meeting Room Reservation Mapping Exercise Results

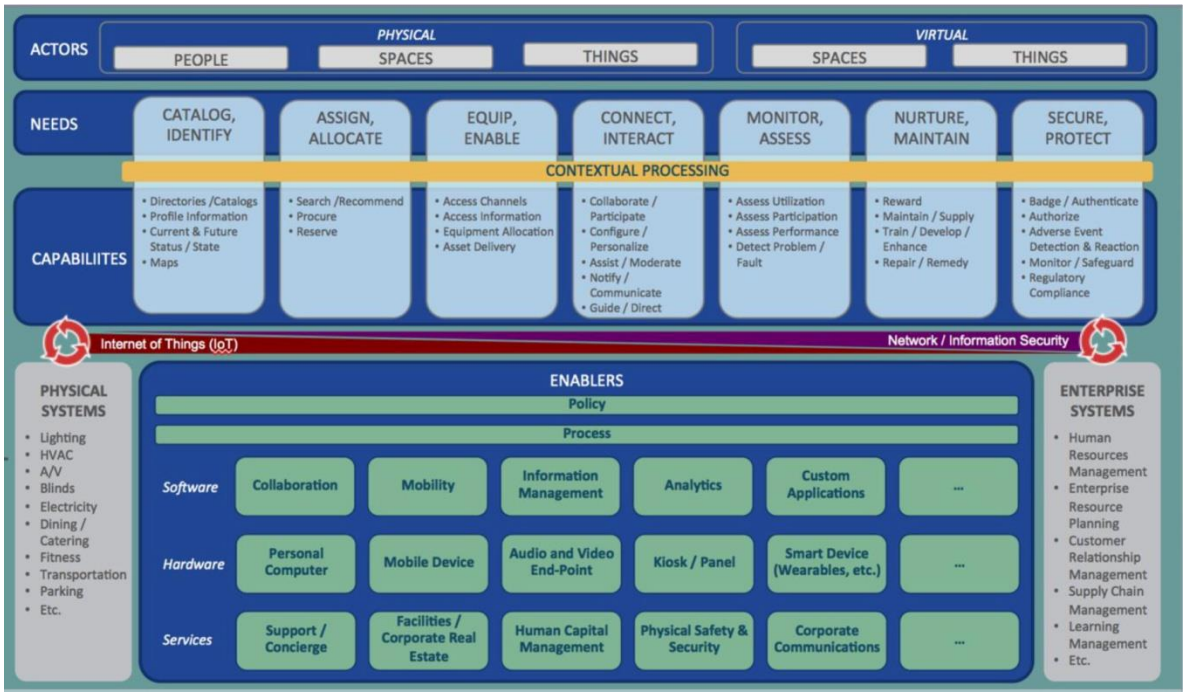


This example clearly shows the importance of considering the service holistically. The assessment process works best with a diverse team across various functions, cultures, and geographies. Creation of a human-centered experience – one that increases productivity and reduces frustration – depends on the careful review of all of the basic needs across the five actors. Other workforce experience opportunity areas, including those shown in the Digital Work Landscape, should be assessed using the same process to ensure alignment with the organizations specific culture and goals. Over time, a comprehensive strategy can be developed using this method.

Reference Framework Architecture

As demonstrated in this paper, there are many facets for consideration at each tier of the model. With this much complexity, it is often helpful to have a template that helps conceptualize all of the components and the relationship to one another. Cisco's Digital Work Reference Architecture (Figure 7) provides this view. It is vendor- and product-independent; designed from the perspective of the business; and shows the relationship of the four tiers of the structured framework, together with other key components and factors, to help with understanding and evaluation of workforce experience needs.

Figure 7. Digital Work Reference Architecture



The actors and needs tiers, and to a lesser degree, the capabilities tier, are defined in Parts I and II of this white paper and are hopefully well understood at this point. Other sections include:

- Contextual processing – the capability for automatically gathering and applying relative information about an activity or task (time, location, status, role, number, and location of participants, etc.) to programmatically infer the desired outcome, and thereby improve or streamline the process

- Internet of Things (IoT) – the tools, processes, and techniques to create connections to the physical spaces and things in the work environment to enable detailed monitoring, analysis, and interaction
- Network and information security – integrated network capabilities that offer seamless, high-performance and secure access to all authorized devices, on or off campus; help ensure the performance of business-critical apps; provide policy-based access based not only on **who**, but also on where, what, when, and how; and integrate rapid threat detection and mitigation throughout the network.
- Enablers – various tools, processes, and capabilities associated with each of the capabilities. As mentioned, enablers are generally beyond the scope of this white paper
- Physical systems – various components that comprise and support the physical facilities of an organization's buildings or campus
- Enterprise systems – the applications that support the strategic information flows for an organization

Attention to all of these components and their interactions, combined with the holistic view offered by the Digital Work Landscape will lead to a structured and strategic approach to the Digitization of Work for any organization.

Conclusion

This structured approach to the Digitization of Work is an evolution of our successful offerings in this space. It responds to current trends driving businesses to become **digital businesses** that take full advantage of collaboration technologies, mobile and location-aware applications, social media, analytics, and IoT solutions across all workforce experience opportunities. This document has offered an overview of the Cisco Digital Work Landscape, Digital Work Framework, and Digital Work Reference Architecture. It is intended as a companion to other materials and discussions with Cisco subject-matter experts for greater detail and understanding. Cisco is committed to helping customers define and implement a Digitization of Work strategy and architecture and to deploy the associated Cisco offerings in their enterprise. To help guide you through an initial Digitization of Work deployment, Cisco recommends that you take advantage of services available through Cisco Services or our partner community. We invite you to discuss your strategy with your Cisco account manager, client services manager, workforce experience advisor, or channel partner.

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