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DeepDives

DATA INTEROPERABILITY
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From the editor's desk

Amy Kluber, Editor-in-Chief

Interoperability Hinges on Tech and People

Making data interoperable is a key component that enables systems to talk to each other. At the Defense Department, this is critical for concepts like Joint All Domain Command and Control (JADC2). For health care, it means enabling patients to receive seamless and holistic care or treatments.

In the grand scheme of things, IT modernization means having interoperable data.

The newest USCDI standards are helping health-focused organizations standardize to be more equitable.

It's also necessary to remember that data interoperability is not always about the technology itself. A leader at the Army noted how the organization is thinking about the human element, meaning thinking through training and processes for the workforce to handle and better innovate around those interoperability principles. ❁

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Army Eyes Building a Network-Centric Environment Toward Interoperability

Information-sharing policies and technical differences contribute to the complexity of effective collaboration between military services and their coalition partners.

BY ANASTASIA OBIS

As the Defense Department pushes for enhanced interoperability with its allies, the Army is prioritizing creating a network-centric environment to better share data with new partners quickly and more efficiently.

At an Army technical exchange meeting in Philadelphia in 2023, Army officials shared their field experiences working alongside their allied partners.

"Current methods of sharing operational intelligence information with multiple partners is inefficient," said Chief Warrant Officer 5 (CW5) Shannon Garrett, senior technical advisor at the Program Executive Office Command Control Communications-Tactical (PEO C3T). "Moving forward, we need to actively pursue new approaches for data sharing and protection with our partners. ... We need to move to a data-centric environment with a goal to get away from having to build a new network each time we have a partner."

Garrett emphasized that zero trust principles will provide a secure foundation for data sharing and collaboration through tools such as ICAM solutions, attribute-based access controls and resource tagging. Once fully implemented in a data-centric zero trust environment, there's also the potential of removing the need for cross-domain solutions, said Garrett.

CW5 Jon Stanley, Indo-Pacific Command's CTO, highlighted communication, technology, doctrine, policy and cultural awareness as major factors exacerbating effective communication and interoperability between military services and their partners.

One challenge has been navigating existing policies and directives around classifying and sharing sensitive information. This is because each service has its own systems in place — impeding the flow of information necessary for effective collaboration. (ctd.)

Photo: Maine Army National Guard Capt. Kody Peckham and Montenegro Military Maj. Milija Cabarkapa participate in Immediate Response 23 in Pirlitor, Montenegro on May 27, 2023. Photo Credit: Master Sgt. Travis Hill/DVIDS

CW5
Danny Burns
CTO, Office of the Deputy
Chief of Staff, U.S. Army

"Policy has to maintain relevance and at the speed of technology," said Stanley. "When it comes to interoperability, many times a technical solution is available, but the policy may prohibit that last mile of interoperability," added CW5 Donald Overton, senior technical advisor at the U.S. Army Europe and Africa component command.

The service is also considering potential knowledge gaps that further hinder successful interoperability. CW5 Danny Burns, CTO at Army's Deputy Chief of Staff Office (G-6), noted his top challenge being the "human dimension" moreso than procedures or technical matters. Even when they operate on the same network using the same systems, personnel might not always understand the technology or procedural requirements, or budget constraints might further complicate technology implementation.

"The term interoperability — people dive right into thinking technical when we're talking about protocols, data formats, the bytes, the bits. ... I think the industry can provide those capabilities. I think the challenge that come for us is really more from the human dimension," Burns said. "We are putting our mission partners in a tough spot as we don't lock in with that technology we are going to utilize, and so there is a barrier toward cost on what they are trying to keep up with us." ✹

"The term interoperability — people dive right into thinking technical when we're talking about protocols, data formats, the bytes, the bits. ... I think the industry can provide those capabilities."

— CW5 Danny Burns, CTO, Office of the Deputy Chief of Staff, U.S. Army

What's New in USCDI Version 4

The fourth version of the interoperability standard is improving exchange of electronic health information for better equity across the health care ecosystem. Here are some of the highlighted additions.

New Data Elements

Substance (Non-Medication)
Represent non-medication substances, including some of the most common allergens such as latex, peanuts, pollens, and eggs.

Encounter Identifier
Link data related to an encounter (e.g., diagnosis, medications prescribed, lab tests ordered, consultations sent).

Facility Type
Where a laboratory test was performed, or to identify where services are available for care planning and emergency response purposes, or when care is provided or received in multiple facilities.

Treatment Intervention Preference
The care planning process may include expressions of interventions, religious beliefs, and overall care experience preferences.

Alcohol Use
Expand the use and exchange of data elements that represent structured assessments, including those that address certain behavioral health concerns.

Average Blood Pressure
Recognized as an independent risk factor in many diseases and health conditions provided.

New Data Class

Facility Information
Data elements provide details to patients and providers regarding the physical location of where services were or could be provided.

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Source: Office of the National Coordinator for Health IT

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# Data Interoperability is Key to Agency Modernization

Agencies can use responsible automation, scalability and collaboration to better adopt data standards and migration.

❋ Digital modernization and cloud migration initiatives remain a priority for many federal agencies. What common challenges might agencies face in achieving data modernization and interoperability?

Pentapati Data modernization and interoperability present significant challenges for agencies across domains in the federal government, such as health, security, finance and operations. Effective collaboration and data integration across multiple systems and formats at scale are essential.

However, achieving data modernization and interoperability is not without obstacles. While some challenges can be broadly classified, there are also mission- and system-specific complexities stemming from customized solutions and accumulated technical debt. Common challenges include communication standards, as not all systems undergoing modernization support the same standards, making data sharing difficult. Inconsistent data structures and formats across different databases can create compatibility issues and lead to data inconsistencies.

Privacy and security are also concerns, especially when sharing citizen data, and require adherence to encryption protocols and and regulatory standards. The cost, technical knowledge and resource requirements associated with building and maintaining interoperable systems can be substantial and present financial challenges for agencies with stringent service-level agreements or limited financial resources. Additionally, relying on
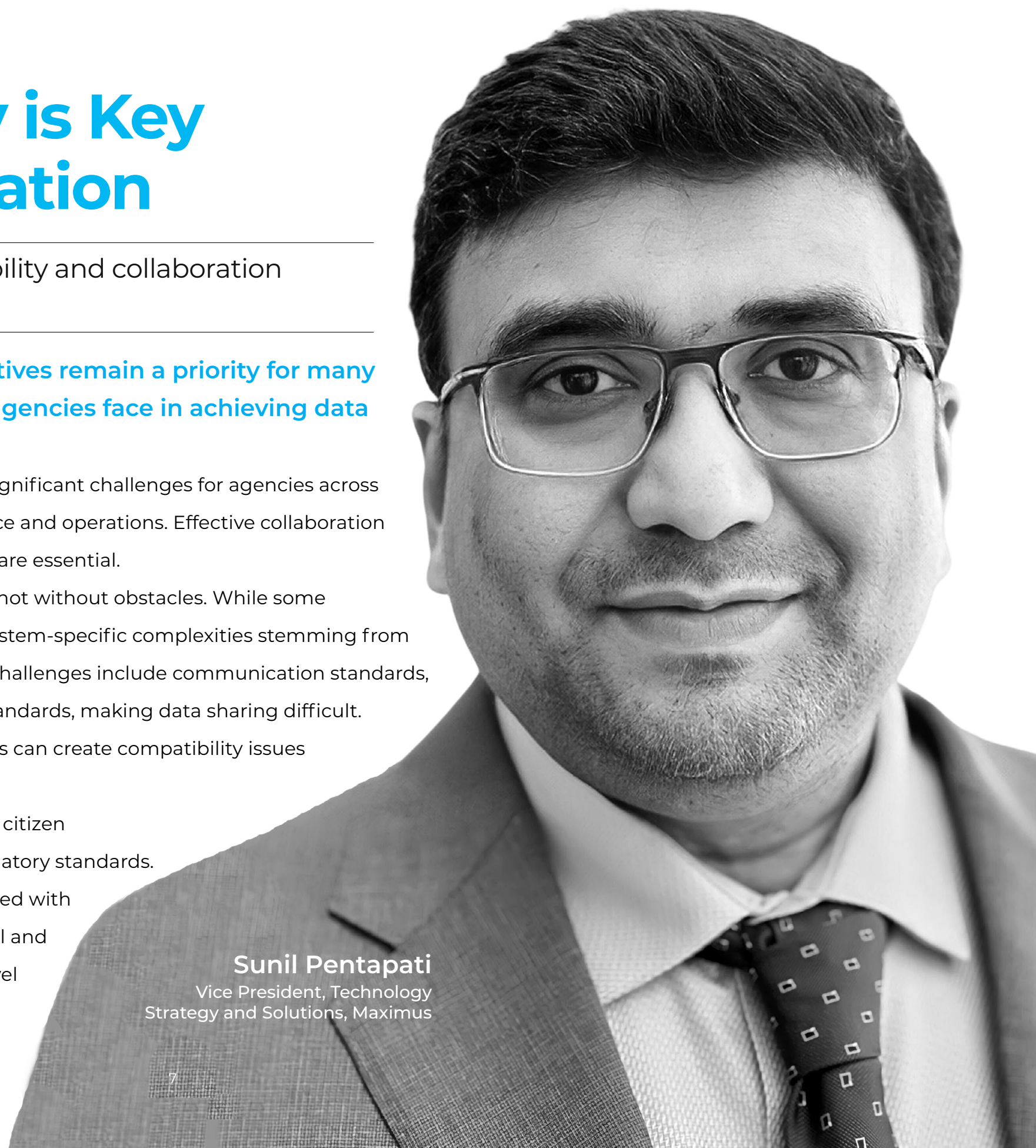
Sunil Pentapati
Vice President, Technology
Strategy and Solutions, Maximus

> **"Data interoperability faces challenges in areas such as security, stability, scalability and governance. While mandating common data standards may not always be feasible, it remains important for agencies to work toward that goal."**
>
> **— Sunil Pentapati, Vice President, Technology Strategy and Solutions, Maximus**

manual processes to address interoperability challenges often falls short in meeting compliance and security requirements, scalability and accuracy of data correlation.

When modernizing data platforms and systems, what approaches and technologies does Maximus utilize to enable data interoperability?

Pentapati At Maximus, we have a deep understanding of our customers' missions and their need to share data across various systems, both internally and externally.

To enable data interoperability, we leverage our technical and agency knowledge to develop systems using open architectures and a combination of commercial-off-the-shelf (COTS) and open-source technologies in a loosely coupled and tightly integrated manner. We focus on simplifying the ingestion and integration of structured, unstructured and semi-structured data through automated processes.

We recognize that data interoperability faces challenges in areas such as security, stability, scalability and governance. While mandating common data standards might not always be feasible, it's important for agencies to work toward that goal. We assist in establishing robust data governance practices by implementing metadata management systems, ensuring consistent quality standards and policies, and facilitating data interpretation and integration across different systems. Also, adopting a data mesh approach can provide more flexibility and scalability for data ingestion while accommodating unique agency requirements. To fully benefit from the data mesh, agencies should shift toward federated governance, where standards are centralized, but domain-specific teams have the autonomy to enforce them according to their needs.

Collaboration is essential and agencies can embed data governance activities into the early stages of development using a "shift-left" approach

within the DevSecOps lifecycle. Additionally, cloud-enabled solutions can serve as centralized locations for storing and sharing data, enhancing interoperability among different systems.

It's important to recognize that data interoperability often requires a combination of these solutions and technologies. By doing so, we can unlock the full potential of data and leverage its value across diverse systems and agencies, with the specific approach tailored to the systems involved, the nature of the data and the desired level of interoperability.

✺ What role do AI and other advanced analytics, such as large language models, play in supporting data interoperability efforts? How is Maximus leveraging these technologies to enhance data sharing between different systems?

Pentapati While AI and large language models have the potential to address many challenges in the field of data interoperability, it is crucial to exercise caution and implement necessary research and controls before they can be widely adopted in the federal government.

One area to consider is developing AI systems that offer transparency into the decision-making process so that it allows for traceability and accountability to prevent biased results. Consequently, large language models should be used selectively and in conjunction with other technologies and solutions, such as data standards, APIs and integration platforms, to achieve comprehensive data interoperability in complex environments.

At Maximus, we recognize the ongoing maturity and evolution of AI systems. As we explore the applications of language models, we focus on specific use cases that align with responsible AI practices. For instance, we are developing systems that utilize language models for data cleansing, identifying and rectifying errors in data, and standardizing data formats to facilitate

Photo Credit: Gorodenkoff/Shutterstock

seamless sharing between different systems. Additionally, we are exploring using language models to translate data from one format to another, enabling interoperability between systems.

Furthermore, within the health care domain, leveraging language models can provide valuable insights that enhance the quality of care and support better decision-making for patient well-being. Additionally, language models can be utilized to generate synthetic data, fill data gaps and create new data sets for research purposes.

By carefully considering the applications of language models and incorporating them into a broader ecosystem of technologies and solutions, we can ensure responsible and effective utilization of AI in the pursuit of data interoperability. ❋

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USCDI Version 4 Adds New Data Standards for Health Equity

The new data interoperability standards include 20 new data elements and one new data class.

BY JAYLA WHITFIELD

The fourth version of the U.S. Core Data for Interoperability (USCDI) standard published in July 2023 includes a new iteration of more health classes and elements that are improving exchange of electronic health information for better equity across the health care ecosystem.

The Office of the National Coordinator for Health IT (ONC) adopted the standard in May 2020 through the 21st Century Cures Act. Since then, ONC continues to update and expand its data elements and classes annually.

"In order to make USCDI data interoperable, it has to be exchanged using a couple of different required exchange methods in our certification program," Al Taylor, ONC's medical informatics officer, told GovCIO Media & Research. "That includes exchanges using the consolidated clinical data architecture documents, [clinical document architecture] for a variety of different ways of exchanging documents, along with using FHIR resources to exchange data that's in USCDI."

"We are using these data elements because we want to have the information, not the anecdotal evidence, but the actual heart, understanding and knowledge of what root causes are, and then how best to solve them through technology and interoperability," said ONC Deputy Director of the Office of Technology Ryan Argentieri at the 2023 HIMSS conference in Chicago.

What's New in USCDI Version 4?

ONC collected over 600 comments over the draft's public comment period to incorporate into the fourth version, which includes 20 new data elements and one new data class, including facility information.

"We went through every single comment, every single recommendation on data elements that were in draft before or data elements that were in prior versions of USCDI," Taylor said. "We made a lot of adjustments to those data elements to better reflect the needs that were included in those comments."

Ryan Argentieri

Deputy Director of the Office of Technology, ONC

Some of the highlighted updates include:

- "Substance (non-medication)" added to the allergies and intolerances data class to incorporate common allergens such as latex, peanuts and pollen.
- "Encounter identifier" added to last year's new "encounter information" data class to link data related to an encounter.
- New "facility information" data classes added to provide details to patients and providers regarding physical location of the services provided.
- Six data elements added to the "laboratory" data class to support ongoing public health reporting needs.

Other updates included those to goals and preferences, health status assessments, medications, procedures and vital signs. Additionally, ONC implemented some changes to definitions and applicable vocabulary standards.

USCDI Supports Health Equity

Overall, the updated version continues to focus on patient-centered data and quality measurement to further health equity goals.

"One of the things it does is it continues, an effort that we've made over the last several versions of USCDI, to add data elements that address certain policy priorities like health equity disparities, underserved communities, behavioral health, behavioral health integration and public health data requirements," Taylor said.

Taylor highlighted that one of the new data elements represents goals and preferences. This means providers will be able to document a patient's expression of their goals and preferences to be part of their care and treatment plans, such as patient desires for whether and when lifesaving interventions are performed, or a birth plan, for example.

In the prior third version released in 2022, ONC added new data classes that focused on insurance information and health status.

"In addition to expanding the USCDI data classes and elements to address

patient access and care needs, many of the added elements are also meant to mitigate health and health care inequities and disparities, address the needs of underserved communities, and support public health interoperability needs of reporting, investigation and emergency response," spokespersons from ONC's Standards Division told GovCIO Media & Research in July 2022.

In April, the Centers for Medicare and Medicaid Services (CMS) and the Center for Disease Control and Prevention (CDC) adopted USCDI standards as they aim to reach public health equity goals and improve public health reporting and response.

With data standardization top of mind, the agencies collaborated in CDC's reorganization that spurred a new office focusing on public health data and interoperability.

"As we stand up the new office, one of our divisions will be dedicated to data policy and standards work. Working across public health, across CDC, but most importantly with our health care and with our federal partners to really accelerate the work will be the incorporation of standards and interoperability particularly across our core data systems," said the office's Acting Director Jennifer Layden on panel at the 2023 HIMSS conference in Chicago.

With the new version published, the agency is now seeking comments for existing data elements and new elements for its upcoming fifth version through Sept. 20, 2023.

"With each change and with each new data element that we add, we recognize that there may be certain amount of burden to not only develop the health IT that is able to handle the new data or ensure that it's captured and exchanged," Taylor said. "We feel like the number of data elements and the complexity of the data elements in aggregate are a reasonable additional lift for all potential users of USCDI version four in the future."

The agency anticipates a fifth draft to release January 2024. ❈

"We are using these data elements because we want to have the information, not the anecdotal evidence, but the actual heart, understanding and knowledge of what root causes are, and then how best to solve them through technology and interoperability."

— Ryan Argentieri, Deputy Director of the Office of Technology, ONC