Serving our customers



Tacoma Public Utility Board

January 25, 2023 – Study Session



Utility Technology Services (UTS) Overview

Leadership Team:

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Agenda



- Foundation of UTS
- Organizational Placement
- Value & Criticality
- Strategy & Governance
- Operational Technology
 - Capabilities, Applications & Platforms, Infrastructure
- Compliance
- Projects & Programs
- Organization
- Delivery of Value
- ITD Services Overview
- Appendices

Foundation of UTS



Services

Tech. Mgmt, Utility Network, Data Center, Apps/Platforms, Security, Compliance, End User, Delivery, Communication & Collaboration

Enablers

Staff expertise, management frameworks & practices Governance, Talent, Maturity, Agility, Resourcing, Cybersecurity, BRM

Core Pillars

TPU <u>critical</u> & <u>operational</u> needs to manage technology Tech mgmt., technology teams, reliance to & evolving technology, investment

Organizational Placement





- Embedded within Tacoma Power, serves all divisions
- UTS technology assets/capabilities leveraged across divisions
- Power, largest Utility within TPU
- Owns majority of the technology infrastructure
- Effective technology mgmt., driven by regulatory compliance

Value & Criticality



Value

- Real-time support of TPU Operations
- Critical Operational technologies mgmt.
- Regulatory compliance mgmt.
- TPU-driven investment stewardship
- Dedicated TPU-focused workforce

Critical to Utility Success

- Ensures reliable, resilient TPU operations
- Enables leveraging of capabilities across TPU
- Cost efficient & effective technology modernization

Utility Governance & Strategy



Utility Governance

- Dedicated TPU governance & decisionmaking
- Oversight to strategy, investments and prioritization
- Proactive mgmt. of technology assets, resources & investments
- Stewards alignment of TPU strategic objectives
- 3 Boards: UTGB, UTSC, UTAB

More details

Utility Strategy

- Supportive to Utility strategic objectives;
- Grid Mod, Grid Resiliency, Smart Water, Smart Rail
- Operational & Utility focused
- Inclusive of TPU strategies, technology trends, operations
- Provides principles, architecture & frameworks

More details

Technology Operating Model



Blueprint on Operational Technology



- Organized into 4 key areas:
- **Capabilities** > expertise, staff
- **Applications** > single department
- Platforms
- > multiple departments
- **Infrastructure** > underlying components

TOM - Capabilities





- Staff expertise
- Provide service, deliver outcomes to TPU
- Continuous improvement; training, framework, maturity
- Recruitment, talent management

Core UTS capability areas:

Capabilities	End User Support	Enterprise Architecture	IT Asset Management
	Strategy & Planning	Cyber Security	Compliance Management
	Delivery	Financial Mgmt. & Support	Contract/Vendor Mgmt.

TOM – Applications & Platforms

Capabilities

TOM

Platforms

Applications





- Utility & operational solutions
- Provides application expertise & support to business
- Turnkey services; from ideation, delivery, operations

Core UTS Applications & Platforms areas:



TOM - Infrastructure





- Fundamental components that allows technology to operate
- Providing security, redundancy & resiliency
- Expertise in design, engineering, architecture, provision, delivery
- 24x7x365 support; backup, recovery, failover, monitoring

Core UTS Infrastructure areas:



Compliance



• NERC

- Reliable, secure operation of power grid
- Critical Infrastructure Protection (CIP)
- Operations & Planning (O&P)

• PCI-DSS

• Protecting customer payment info

More details (NERC CIP)

More details (PCI)

Projects & Programs



Advanced Meter Infrastructure, ~\$72M program

- Technology PMO:
 - 2016-2024, 42 strategic projects @ \$120M
- Key participant throughout Energy Imbalance Market
 program

Organization



• Highlights

- 117 FTEs, ~35+ contractors, Vendor contracts
- 44 unique staff classifications
- 28 functional teams, 6 technology depts.
- 13 Cost Centers

2023/24 Biennium Budget

- Labor: ~\$43M
- Other O&M: ~\$25M
- Capital: ~\$68M

Delivery of Value



Enabling delivery of essential services

- Automation, command & control
- Protecting Critical Infrastructure, Facilities & Personnel
- 24/7/365

Facilitating customer contact & engagement

Meeting today's needs & preparing for tomorrow's

ITD Services Overview



- SAP ERP/CRM
- MS Productivity Suite (O365, Sharepoint, Outlook)
- Enterprise-wide business apps (e.g., Mobile Workforce Mgmt.)
- City of Tacoma corporate network (non-operational), internet, VPN
- Supporting Enterprise-wide services (Help Desk, Project Support)

Appendices





TPU Technology History



1972	2008	2012-2013
Resolution U-4027	Resolution 37550	Smart Grid & UTS
Sept. 13, 1972	July 29, 2008	2012 through 2013
Within Tacoma Municipal Code	Resolution allowing TPU to	Smart Grid is established. TPU
(TMC), established Data	operate information technology	begins to consolidate technology,
Processing Division acting under	systems independent of City GG.	develop CIP (compliance)
the direction of Director of	RESOLUTION NO. 37550	program and formation of UTS.
Utilities.	BY REQUEST OF MAYOR BAARSMA AND COUNCIL MEMBERS ANDERSON, LONERGAN, AND STRICKLAND A RESOLUTION relating to administration; declaring that the Department of Public Utilities use of the services of General Government departments, officies, and agencies kulfils the requirements of Section 4.17 of the Tacoma City	
	WHEREAS, Proposition 3, approved by a vote of the people on November 3, 1992, directed that the Department of Public Utilities shall use the services of the City's General Government finance department, purchasing agent, law department, human resources/personnel department, and other City departments, offices, and agencies, except as otherwise directed by the City Council, and	Early shaping of "Why UTS" Core Pillars
	WHEREAS the most recent general management survey performed for the City Council of all the utilities under the jurisdiction of the Utility Board concluded that no further consolidation of services was recommended, and WHEREAS, to date, the City Council has not taken formal action on the manual recommendation of the general management survey. Now, Therefore,	Consolidate Utility Technology Management
References	BE IT RESOLVED BY THE COUNCIL OF THE CITY OF TACOMA: Section 1. That the Department of Public Utilities is authorized to operate stand-alone information technology systems in Department of Public	diship
City Council Archives	Utility plants independently of the services of General Government Information Technology.	
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BUNIONS

- Tacoma Municipal Code
- Tacoma City Charter •
- Pierce County Voting Archives •
- Tacoma City Council Resolutions & Ordinances

Core Pillars

UTS > Core Pillars

Recognizing that TPU has a 50 year+ business need to manage their 'Technology Destination', the Utility Technology Services (UTS) department has evolved around those initial Core Pillars - continuing to refine and support the management of technology within TPU.

Those Core Pillars are further described as;

- **Consolidate Utility Technology Mgmt.:** Prior to the creation of UTS, disparate technology solutions existed across the Utility which were being managed in silos. Consolidation of technology and the provision of centralized management and support through UTS minimizes technology risks and ensures efficiency, cost effectiveness, regulatory compliance, and consistent and high quality support for the Utility's technology needs.
- Utility Specific Technology Team: Utility technology applications and solutions are highly customized with complex sets of business, technical and regulatory requirements. With a team possessing in-depth knowledge and experience within the utility sector, UTS is strategically positioned to deliver and support the Utility's evolving needs.
- **Technology Reliant:** The Utility is operationally dependent on technology today. The reliance on technology continues to grow and deepen with every strategic advancement. UTS deploys and supports critical communications and operational technology solutions vital to the successful operation of the Utility. Technologies range from industrial control platforms used to automate the electrical grid, to radio communications used for the dispatching of field crews, to everyday phone and computer support.
- **Evolving Technology Needs:** Digitalization and evolving customer needs is requiring the Utility to undergo complex technology transformation. These transformations expose the Utility to cyber threats requiring a strong cybersecurity practice. UTS is responding to the evolving environment by executing its Utility Modernization Strategy and Roadmap.
- Investment Stewardship: Technology investments represent a large portion of utility spending. Through the Utility Modernization Roadmap and the technology project portfolio management, UTS ensures technology investment decisions are aligned with business outcomes and are deployed and maintained cost effectively.





Key Enablers

UTS > Key Enablers

Recognizing that TPU has a 50 year+ business need to manage their 'Technology Destination', the Utility Technology Services (UTS) department has evolved around those initial Core Pillars - continuing to refine and support the management of technology within TPU.

Built upon the Core Pillars, fundamental to the ongoing management of technology - TPU has further recognized the following key **enablers**;

- **Governance:** Ensuring effective and efficient use of technology in enabling the TPU to achieve its goals, through effective evaluation, selection, prioritization, and funding of competing technology investments while overseeing their implementation; and extracting business benefits.
- **Business Relationship Management (BRM):** As a service provider, UTS establishes and maintains a tactical and strategic business relationship with TPU divisions based on understanding them as a customer and their business needs.
- **Cybersecurity:** UTS ensures cyber security and resiliency standards are enforced in critical operational environments, providing local control and management. With UTS, TPU maintains a security posture ready to rapidly respond to a growing array of threats.
- **Resourcing:** UTS has adopted an adaptive resourcing strategy to deliver expertise as business cycles dictate, which allows TPU to adjust the scale of UTS' operating and delivery footprint.
- Agility: With staff that is keenly aware and familiar with business requirements and environment; UTS is able to more rapidly develop, customize and deploy solutions. Outsourcing this work often results in additional cost and time.
- **Maturity:** Through the ownership of the Core Pillars in conjunction with the Ancillary Support, UTS is able to focus on service specific maturity roadmaps to ensure continuous improvement of Services.
- **Talent**: UTS is integral to supporting the Utility's technology strategy as well as operations. UTS' workforce is equipped to achieve innovation through the delivery of digital, analytics and customer experiences.





Service Categories

UTS > Service Categories

Services provide technology-related outcomes that aim to support and achieve TPU business strategies and objectives. UTS delivers a number of technology services to the Utility divisions and departments.

Extending beyond the Core Pillars and Enablers, UTS offers the following key Service Categories;

- **Technology Mgmt.:** Focused on excellence in mgmt.; includes leadership, strategy, enterprise architecture, financial mgmt., resource planning, asset mgmt., contract/vendor mgmt., administrative & business support services.
- Data Center: The provision and mgmt. of data centers for compute, storage, network and other technology equipment. Includes Utility Enterprise data centers, Backup Control Center, computer/distribution rooms, server hosting (virtual and physical), data storage, backup & recovery services.
- **Application/Platform:** The mgmt. of business applications and systems critical to TPU utility services to end-user customers. Includes integration, monitoring & support for core Utility systems.
- Security & Compliance: Services includes identity access mgmt., security awareness, cybersecurity/incident response, threat/vulnerability mgmt., governance, compliance for Critical Infrastructure Protection (CIP) and& network/security monitoring.
- End User Support: Services includes TPU users devices, business applications, connectivity to enable communication, & workforce tools. Additionally; UTS Service Desk, Audio Visual design & support, telephony & Land Mobile Radio support & training.
- **Delivery:** Services include Project & Portfolio Management, Information Technology Service Management (ITSM), Organizational Change Mgmt. (OCM) & advisory/consulting services.
- Utility Network: Services includes the provision, interconnection, support & maintenance of the voice & data networks for TPU's operational & industrial control systems. In-scope network element include; core connectivity for TPU's physical access control, security camera, land mobile radio/satellite communications, SCADA systems as well as compliance assurance & remote site support.
- **Communication & Collaboration Services:** Provides the services needed for TPU employees to communicate, internally and externally, and work together to achieve business goals and objectives.





Utility Technology Governance





Description. In 2013, TPU established a Utility Technology Governance structure to define Utility-wide technology strategy that provides oversight to TPU's growing footprint, investment and oversight of technology. This structure consists of four key structures; UTGB, UTSC, UTAB and the respective Steering Committees.

Value to the Utility.

- Proactive management of Utility technology assets and resources.
- Maximized benefits from technology investments.
- Alignment to Utility strategic objectives.
- Dedicated governance and decision-making structure.
- Improved services to TPU customers and ratepayers.

Key Functions.

- (UTGB/UTSC) Review and approve TPU's technology strategy and direction.
- (UTGB/UTSC) Provide oversight to technology; to include approvals, recommendations, addressing escalations, reviewing progress of programs, projects and product investments. Review, approve and prioritize technology investments.
- (UTGB/UTSC) Communicate and champion strategy and investments within respective Utility divisions.
- (UTAB) Plan, design, implement and maintain a comprehensive enterprise architecture; ensuring solution adherence to standards and compliance requirements.
- (Steering Committees) Provide program, project and product governance ensuring alignment to and engagement with Utility wide strategy and governance boards.

References.

- UTGB Home Page
- UTSC Home Page
- UTAB Home Page

Utility Technology Strategy



Description. The following provides a brief summary of the TPU Technology Strategy. See the reference links below for details.

Utility Technology Strategy encompasses multiple activities that ultimately provides inputs (from comprehensive plans, to stand alone strategic deliverables) to TPU's business strategies.

Value to the Utility.

- Defines and provides the range of possibilities toward implementation and support of utility strategic objectives, including grid modernization, grid resiliency, smart water, and smart rail.
- Provides operational and utility-based technology focus and vision to the UTS organization in the effective adoption, usage, design, management and retirement of key operational and utility technology solutions and services.
- Provides guiding principles, architecture and governance framework to implement and manage operational and utility technology solutions and services to enable the mission of TPU and serve TPU customers across TPU's diverse service territory in the South Sound.

Key Functions.

- Actively engage and participate in the ongoing development and review of Utility division's business strategies.
- Work toward understanding current, near and future state Utility market and operational technology trends.
- Bringing together input from TPU business strategies, operational technology trends and current state operational plans into a forward looking strategic Utility Technology roadmaps.
- Develop, implement and provide guidance around Technology Principles, Reference Architecture and Governance Framework.

References.

- <u>Technology Strategy Demystified</u>
- <u>Utility Technology Principles</u>
- <u>Utility Technology Reference Architecture</u>
- <u>Utility Technology Governance Framework</u>



Technology Operating Model



Description. A technology operating model is a blueprint of describing how UTS operates, depicting how UTS orchestrates its capabilities and services to achieve TPU technology objectives. It is broadly organized into Capabilities, Applications, Platforms and Infrastructure. Provided are core examples within each of the four areas.



TOM – Core Capabilities Overview



End User Support	Enterprise Architecture	IT Asset Management	
Strategy & Planning	Cyber Security	Compliance Management	
Delivery	Financial Mgmt. & Support	Vendor/Contract Mgmt.	

Description. Core capabilities is used to describe the staff expertise required to drive positive technology outcomes. Additionally, core capabilities also includes ensuring alignment and ongoing improvements toward frameworks and processes.

Value to the Utility – Technology Capabilities

Capabilities

UTS attracts, recruits and retains the technical knowledge and expertise to help TPU achieve technology and business objectives and outcomes.

Key UTS Core Capabilities

Common UTS Capability Activities

- Recruitment, onboarding.
- Talent management; professional and personal development.
- Process and Framework Maturity.

Capability	Utility Value	Key Facts
Strategy & Planning	Utility technology strategy to provide long-term planning & direction on recommended technology usage, lifecycle management, capability development, resource optimization, risk management, and ongoing lessons learned.	 Utility technology roadmap, principles, SWOT, governance framework, reference architecture, & performance metrics (2023 – 2028 timeframe)
Delivery	The skills & expertise to facilitate the delivery new products & services in order to achieve TPU business objectives. Delivery capabilities include Portfolio, Product & Project management.	 UTS PMO, between 2106-2024; 42 strategic projects valued at ~ \$120 M 2 large programs; AMI (~ \$72 M) and EIM
Enterprise Architecture	Facilitate the utility technology architecture practice, including reference architecture definition, technical standards definition, & ensuring solution adherence to architecture standards.	 Level 3.9 architecture maturity on Garter IT Score Over 50 solution design packages Over 100 technical control systems standards defined
Critical Comms	Includes voice communications (telephone and radio), as well as other services such as SCADA. Critical Comms services are necessary for a variety of operational processes (including command and control of critical infrastructure) and for the safety of personnel performing work in a wide range of locations and working conditions.	 Infrastructure, networks and systems providing Transport, SCADA, Telephony, Radio, and Security for Power, Water, Rail and Customer Svcs Technology footprint spans 6 Western Wa Counties
Financial Stewardship	Managing the holistic financial condition of technology operations and investments for TPU. Capabilities: architecting, negotiating, lifecycle maint. & vendor mgmt activities for technology contract engagements; compliance with City policy, GASB, FERC, and NERC; technology CapEx & OpEx cost controls, variance analysis, forecasting, and budget development.	 \$120M+ Combined CapEx & OpEx biennial budget ~30 unique spend plans under active management Contract portfolio value of \$166M 158 active contracts + 124 active vendors

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Capability	Utility Value	Key Facts
Cyber Security	Design/implement necessary security controls to protect against Critical Infrastructure orientated attacks and to meet regulatory compliance; monitor, correlate, enrich and analyze threat/vulnerability data to detect a breach; respond by investigating/remediating breaches to limit damage; adapt/evolve security controls based on incidents and changing technology environment and external threat landscape. The program includes an ongoing employee Cyber Security Awareness program used across TPU and City of Tacoma.	 In 2022, UTS Security Operations received a monthly avg. of 31 security alarms – investigating on avg. 73% in further detail, successfully defending with zero breaches In 3 years, TPU's Cybersecurity program maturity has progressed from the lower 25% of peer utilities to above avg.
Physical Security	Video, access control to protect people, facilities and assets at TPU Main campus, staffed and unstaffed remote locations. This capability also leveraged for a variety of operational needs and in support of various federally-mandated compliance obligations	 Protects assets, property and people at main campus and most remote sites Key components of CIP Compliance Program
IT Asset Management	Facilitates the TPU-Wide IT asset management program that includes equipment and software procurement, receiving, asset tagging, monitoring, tracking and disposal of IT Assets within TPU to include software license management. Key facts (Scale & Magnitude info).	 \$2M TPU Biennial PC Replacement program Asset tracking for End User computing, Printing, Network/Telecomm, Software& Data Center assets Level 2.3 asset management maturity model
End User Support	Provides TPU users with devices, business applications, and connectivity to enable communication, and workforce tools. Additionally provided; UTS Service Desk, Desktop Support.	 Support Area: TPU main campus, 33 remote sites. Support 1744 end users, 1716 user accounts, 1689 computers, 203 copiers & printers, 780 cell phones
Compliance Mgmt.	Provides implementation and management to key Utility and technology related compliance programs, such as CIP, PCI.	 Good industry reputation for NERC-CIP compliance 25+ Technology Subject Matter Experts

TOM – Applications Overview



Applications

Power Water

Rail

Market Services

Description. Providing application services across TPU, "Application Services" solutions & services used by and provided to achieve outcomes for a <u>single</u> business unit.

Value to the Utility – Application Management

- Deploy, manage high performing products that meet business objectives.
- Provides application delivery expertise & support services to business solutions.

Common UTS Application Lifecycle Mgmt. (ALM) Activities

- Overall development and initiative management, release/operational planning.
- Requirements mgmt., build/configure/integrate, testing/defect mgmt., deploy, vendor/contract mgmt.
- Application/product steering committee & governance participation.

Customer

Services

- System monitoring, maintenance, patching, upgrades, enhancements & decommission.
- Incident & Service Request response; troubleshooting, hot fixes, account & access mgmt.

Application	Division	Utility Value
Energy Mgmt. System (EMS)	Power	EMS is a crucial <u>operational</u> system that provides Power the capabilities to monitor, control, schedule and optimize fundamental elements of the electric grid; balance generation/load, maintain frequency, and participate in wholesale energy markets.
Outage Mgmt. System (OMS)	Power	OMS is a critical <u>operational</u> system that provides core outage capabilities to TPU operations and field staff. Additionally, OMS interfaces with IVR and My Account to provide customer facing interactions related to viewing and reporting power outages. Public Affairs directs all media related to outages to the public facing Outage Map.
Power GIS	Power	GIS provides the foundational layer for effective asset management, as well as providing crucial data for spatial analysis, managing field operations and improving compliance.
My Account (CEP)	Customer Services	TPU's web-based Customer Engagement Portal (CEP) provides <u>TPU customers</u> with features - such as online bill pay, access to consumption data, programs and account information.
iNovah	Customer Services	Critical to the collection of revenue – iNovah directs the payment <i>collection and processing</i> for all TPU <i>credit card based payments</i> and payment related interfaces/systems.
Verint	Customer Services	Verint is a multi-functional system that provides capabilities that <i>captures customer interactions</i> , providing opportunities for quality and evidence assurance and staff training. In addition to reporting, the system provides Customer Service operational scheduling and work management features.
Salesforce	Customer Services	Allows <u>TPU customers</u> to interact and submit information related to Utility Assistance (Residential, Business, CARES Emergency) and Utility Attestation Programs.

Key Utility Applications

TOM – Applications Overview



Applications

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Rail

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Application	Division	Utility Value	
OpenScape (OSCC)	Customer Services, Power, UTS, Water	Provides queuing and skills-based routing for customer contacts to various TPU business units, which is key to ensuring efficient and effective customer support. For example, Customer Services leverages OSCC to ensure calls routed by the IVR end up in queue of an agent who is available to take calls and has the experience/training to address the customer's issue.	
ASC	Power	Records incoming and outgoing calls and radio contacts of Power Dispatch and Real-Time Energy Traders. These recordings are necessary for O&P NERC Compliance, and they get used in safety and other operational investigations when incidents occur in the field, etc.	
Xpert	Power (soon, also Water)	The Xpert application runs the specialized telephony voice terminals for Power/Water dispatching and Power Trading. Provides simplified dialing capabilities to allow quick and efficient voice contact with a variety of internal and external staff, stakeholders and partners.	
Milestone	TPU Security	Milestone is the recording platform for cameras. In additional to recording and storage – the platform additionally provides analytics and retrieval/recording for security and operational cameras.	
Pinnacle	TPU Security	Pinnacle is the application that manages the Physical Access Control System. As a key function to ensuring physical security across all TPU campuses and locations, Pinnacle provides for permissions-based access to controlled access points.	
Radio Consoles	Power, Rail, Water	Specialized software terminals that allows Power/Water dispatch to interact with field staff over land mobile radio system.	
Cherwell	UTS, Facilities	Facilitates the tasks and workflows associated with the management and delivery of quality Technology and Facilities Services across TPU by providing a on stop shop for TPU employees and Service Providers for reporting, tracking, resolving incidents and fulfilling service requests. Serves as a CIP data repository.	

Key Utility Applications

TOM – Platforms Overview





Description. Providing platform services across TPU, "Platform Services" solutions & services used by and provided to achieve outcomes for <u>multiple</u> business units.

Value to the Utility – Platform Management

- Deploy, manage high performing platforms that meet business objectives.
- Provides platform solution delivery expertise & support services to business solutions.

Common UTS Platform Lifecycle Mgmt. (PLM) Activities

- Overall development and initiative management, release/operational planning.
- Requirements mgmt., build/configure/integrate, testing/defect mgmt., deploy, vendor/contract mgmt.
- Application/product steering committee & governance participation.
- System monitoring, maintenance, patching, upgrades, enhancements & decommission.
- Incident & Service Request response; troubleshooting, hot fixes, account & access mgmt.

Platform	Division	Utility Value	Key Facts
Physical Security	TPU	Perimeter & campus security including access control, CCTV (Video), intrusion detection all protecting and monitoring TPUs campus as well as remote Power and Water facilities. The primary utility value is on protecting critical infrastructure, facilities, and assets, and safety of personnel. This platform also gets leveraged for specialized operational uses on a case-by-case basis.	 550+ of cameras Video management/recordings managed across 40 servers & 38 workstations 300+ of access control points
Telephony Services	ΤΡυ	Telephony platforms provide capabilities across TPU to provide voice communication, capabilities and call flow to Utility Mission Essential Functions; to include dial and voice capabilities and E911 database management.	 3600+ end point devices Resilient infrastructure supporting operations in 6 Western WA Counties
Land Mobile Radio	ΤΡυ	The LMR platform provides reliable & instant wireless communications for safe, efficient work practices across TPU and public safety. LMR further provides a two-way, critical means of communication between control centers & field staff.	 800mHz trunked system in-town 4 stand-alone VHF radio systems for Power/Water Remote Locations
Meter Data Mgmt. (MDM)	Power, Water	Backend system that consumes & processes all Utility meter data from Advanced Meters. This highly integrated system is a key source to provide customer meter info . to many other systems, including real-time outage/tamper alarms information & customer consumption data.	 Real time, 5 to 15-minute data loads for all Utility Advanced Meters Single largest data producing system in TPU
Data Services	TPU	Provide advanced analytical services across TPU, including data engineering, machine learning, data governance facilitation, data visualization, and data warehouse/data lake administration. Data science and analytics help TPU to identify trends, patterns, risks and information – which can subsequently help the improve the quality of decision making and operations.	 100s of utility datasets available for analytics in Snowflake Administer utility-wide data catalog with over 300 datasets registered

Key Utility Platforms

TOM – Platforms Overview



Platforms as a Service	Genesys (IVR)	Drone Services
(PaaS)	Audio/Visual Services	

Description. Providing platform services across TPU, "Platform Services" solutions & services used by and provided to achieve outcomes for <u>multiple</u> business units.

Value to the Utility – Platform Management

- Deploy, manage high performing platforms that meet business objectives.
- Provides platform solution delivery expertise & support services to business solutions.

Common UTS Platform Lifecycle Mgmt. (PLM) Activities Overall development and initiative management, release/operational planning.

- Requirements mgmt., build/configure/integrate, testing/defect mgmt., deploy, vendor/contract mgmt.
- Application/product steering committee & governance participation.
- System monitoring, maintenance, patching, upgrades, enhancements & decommission.
- Incident & Service Request response; troubleshooting, hot fixes, account & access mgmt.

Platform	Division	Utility Value	Key Facts
Genesys (IVR)	Customer Services, Power	Interactive Voice Response (IVR) is a combination of integrated solutions that provide the ability for both external TPU customers and internal TPU staff to interact; to include TPU customers making payments, reporting outages and internal field staff initiating field orders.	 Since 2018; 616,342 IVR calls \$143 Million in bill pays processed 21% IVR self-service (no TPU assistance) 76,221 calls, residential account queries
Audio / Visual	TPU	Specialized software allowing for monitoring and remote troubleshooting of new A/V systems deployed in shared spaces (such as conference rooms) throughout the TPU campus and locations. These capabilities provide improved capabilities of employee interaction and engagement.	 Not yet in production 2 rooms 23/24 planning for further deployments
Drone (UAS) Services	Power T&D, Gen	Unmanned Aircraft Systems (UAS) provide cost effective methods in conducting assessments & collecting visual information of power lines, vegetation & construction projects; subsequently improving safety by reducing the need to deploy crews & equipment.	 268 flights conducted 53 flight projects 397 KM flown

Key Utility Platforms

TOM – Infrastructure Overview





Description. Providing infrastructure services across TPU, "Infrastructure Services" are often the foundation of technology. Existing in data centers and throughout the organization, infrastructure may consist of hardware, software, cables and network devices.

Value to the Utility – Infrastructure Management

- Infrastructure provides the fundamental components that allows much of technology to operate from.
- Well designed infrastructure provides security, redundancy & resiliency to technology and business operations.

Key Infrastructure Elements

Common UTS Infrastructure Activities

- Design, engineer and architecture
- Provision, installation, configuration, testing
- Backup, recovery, disaster recovery, failover
- Monitor, maintain, patch

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Element	Division	Utility Value	Key Facts
SCADA	Power/Water	SCADA systems provide real time data and information for sensors supporting <i>critical operations</i> of Power and Water systems. This real time data is essential to effectively manage critical infrastructure.	Polling 97 RTUs @ Power facilities across service territory & generation plants, data exchange w/6 adjacent entities, real- time monitoring 20K status points & 9,500 analog data points
Wide Area Network (WAN)	All Divisions	Wide area network connects all TPUs locations for the exchange of critical <u>operational</u> data to include SCADA, Teleprotection, Corporate Network, Telephony, Radio & Security.	 150 Routers 30+ Microwave sites, 6 Western WA Counties
Field Area Network (FAN)	All Divisions	Network supporting field devices for TPU's critical operational & industrial control systems.	 Highly resilient architecture; includes 300+ network switches deployed across various local & remote sites 20+ firewalls
Telephony	All Divisions	Distributed, resilient network architecture supporting critical voice communications within TPU Divisions & with neighboring/partner entities.	 Core PBX & 12+ distributed phone cabinets (IPDAs) 3600+ end users, 6 Western WA Counties
Security	All Division	Distributed network architecture allowing for access control and security video supporting Security Monitoring Center activities & CIP compliance program	 550+ cameras 300+ access control points Distributed network architecture Advanced analytics, monitoring and alerting capabilities
Land Mobile Radio (LMR)	Power, Water, Rail	Critical wireless communication supporting <u>operations</u> - control centers & field staff.	 800 system: Central Master site @ TPU, Prime site at Pearl 6 simulcast sites 5 VHF radio systems supports Power Hydro & Water Headworks sites 550 simulcast subscribers

TOM – Infrastructure Overview



Infrastructure	Data Center	Compute & Storage Services	Operating System Services	Secure Remote Access
as a Service	Networking	Monitoring	Cybersecurity	
(laaS)	Components	Services	Platforms	

Description. Providing infrastructure services across TPU, "Infrastructure Services" are often the foundation of technology. Existing in data centers and throughout the organization, infrastructure may consist of hardware, software, cables and network devices.

Value to the Utility – Infrastructure Management

- Infrastructure provides the fundamental components that allows much of technology to operate from.
- Well designed infrastructure provides security, redundancy & resiliency to technology and business operations.

Key Infrastructure Elements

Common UTS Infrastructure Activities

- Design, engineer and architecture
- Provision, installation, configuration, testing
- Backup, recovery, disaster recovery, failover
- Monitor, maintain, patch

Element	Division	Utility Value	Key Facts
Data Centers	All Divisions	UTS manages two data/control centers providing redundant power, HVAC, networking infrastructure required for 24/7 operations	ECC Data Center: Tier 2+, 15 Server Racks, 50% Utilized Capacity BUCC Data Center: Tier 2 – 9 Server Racks, 75% Utilized Capacity
Networking Components	All Divisions	Routers, switches, firewalls, etc. Network segmented into numerous security zones to minimize outage/security impact to operations.	Core network: 10 routers, 40 access switches, 10 next-gen firewalls, 2 Firepower IDS appliances
Compute & Data Storage Services	All Divisions	Hyperconverged Infrastructures (HCI), physical servers, Virtual Desktop Infrastructure, network attached storage, data protection backup/recovery. Server/client computing required for 24/7 operational, utility customer & business systems.	2-7 Node VxRail HCI (COE), 3-3 Node VxRail HCI (Water SCADA / Generation PCS), 9-2 Node VxRail HCI (Generation PCS), 250+ Virtual Servers, 60 Physical Servers, 40 TB Flash Storage Array, 120 TB Data Backup, 150 Virtual Desktops, 65 OT Workstations, 3 Video walls
Monitoring Services	All Divisions	Network Management System (NMS), Security Information and Event Management system (SIEM). Provides real-time monitoring and alerting for outages/events impacting availability of systems.	NMS – 450+ monitored devices, 3900 device interface connections SIEM – 70+ million logged events/day; Average 25+ alarms/day requiring investigation/mitigation
Operating Systems / Domain Admin	All Divisions	OS configuration, hardening, maintenance & patching. Domain administration includes security policy & user account management. OS maintenance & account management fundamental to security.	Vmware ESXi (41), Cisco iOS (72), Microsoft Server 2012, 2016, 2019 (250+), Red Hat Enterprise Linux 8 (40), MS SCCM & WSUS systems, RHEL Satellite, Active Directory 2016 Domains (6), 700+ User accounts.
Cybersecurity Platforms	All Divisions	Advanced AI-enabled Intrusion Detection (IDS), Endpoint Detection & Response (EDR), Vulnerability Scanning. Real-time monitoring of systems for indicators of compromise to minimize security risks	IDS monitoring at Data Centers, substations (77) & hydro/fish facilities (9), and Water CC/Filtration plant. EDR endpoints (600+), automated scanning for non-critical systems/controlled for critical systems
Secure Remote Access	All Divisions	Discreet management of remote access to systems (employee / contractor) and records activity for accountability minimizing risk.	4-Secure Remote Access systems, 4-Multifactor authentication devices 75+ User accounts, 150 accessible endpoints.

Compliance; NERC-CIP

Description. The NERC CIP standards are the mandatory security standards that apply to entities that own or manage facilities that are part of the US and Canadian electric power grid. They were initially approved by the Federal Energy Regulatory Commission (FERC) in 2008. Under the Energy Policy Act of 2005, NERC was designated as the official Electric Reliability Organization (ERO) for the US power grid and NERC standards were given mandatory status, with the ability for NERC to issue fines with FERC approval.

The NERC CIP standards generally encompass the same breadth of topics as other cybersecurity frameworks such as the NIST CSF or CIS Top 20 Controls, but they are more prescriptive than those frameworks and are enforceable on those entities that are subject to them, including the application of potentially large fines in the case of non-compliance.

Value to the Utility – NERC CIP Compliance

- Implement policies, processes, technical designs, solutions, and frameworks to secure critical utility systems/infrastructure and collect evidence of compliance
- Fines for non-compliance usually 5 digit, can be more than million dollars.

Current NERC CIP Standards

CIP-002	BES Cyber System Categorization
CIP-003	Security Management Controls
CIP-004	Personnel & Training
CIP-005	Electronic Security Perimeters
CIP-006	Physical Security of BES Cyber Systems
CIP-007	System Security Management
CIP-008	Incident Reporting & Response Planning
CIP-009	Recovery Plans for BES Cyber Systems
CIP-010	Configuration Change Management and Vulnerability Assessments
CIP-011	Information Protection
CIP-012	Communications between Control Centers
CIP-013	Supply Chain Risk Management
CIP-014	Physical Security

Key Compliance Technology Investments

Standard / Requirement	Technical / Automated Tool	
CIP-003 R2 & CIP-004 R1	Inspired Learning – (Cloud based cybersecurity training)	
CIP-003 R2 &CIP-004 R2	Articulate360 – (Cloud based NERC CIP specific training)	
CIP-005 R1 Part 1.5	Cisco FirePower IDS – (Network intrusion detection system)	
CIP-005 R2	BeyondTrust Privileged Remote Access – (Intermediate remote access system)	
CIP-005 R2	RSA SecureID – (Multifactor authentication platform)	
CIP-006	Sielox Pinnacle Security – (Physical access control system)	
CIP-007 R1	Microsoft Group Policy – (Local firewall rule deployment/enforcement)	
CIP-007 R2	FoxGuard Patch Availability Report – (Security assessment service)	
CIP-007 R2	WSUS & Red Hat Satellite – (Security patch deployment system)	
CIP-007 R3	Carbon Black App Control & EDR – (Endpoint malicious code detection/response)	
CIP-007 R4	LogRhythm SIEM – (Security log collection/alerting)	
CIP-009	Avamar Data Protection – (Recovery data backup solution)	
CIP-010 R1 Part 1.1	CimCor CimTrak Integrity Suite – (Configuration monitoring tools)	
CIP-010 R1 Part 1.2	Cherwell Service Management – (Asset tracking/Change management)	
CIP-010 R3	Rapid7 Nexpose – (Vulnerability assessment scanning)	
CIP-011	Microsoft SharePoint – (Electronic information repository)	
CIP-013	Cobblestone – (Procurement/vendor contract management)	



NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

UTS NERC CIP Organization

- NERC CIP Senior ManagerCIP Program Manager
- NERC CIP Training Specialist
 20 Subject Matter Experts
- CIP Program Specialist





Compliance; NERC-CIP



Common NERC CIP Activities

- CIP-002
- Inventory/Assess criticality of technology associated with High/Medium Assets
- Maintain BES Cyber Systems Lists
- Inventory of all protected cyber assets

CIP-003

- CIP Senior Manager
- Review/Approve all Policies, Plans, Processes related to NERC CIP Compliance annually
- Cyber awareness training for substation/generation plant staff
- Cyber incident response plans for substations/generation plants
- Inventory/document all communications paths at substations/generation plants
- Apply electronic security controls to substation/generation
 plant communications
- Inventory/secure all transient devices used in substation/generation plants

CIP-004

- Cybersecurity awareness campaigns and posters
- Maintain NERC CIP specific training program
- Maintain/authorize role based access to protected systems
- Review all protected system accounts quarterly

CIP-005

- Design/implement electronic security perimeters
- Inventory inbound/outbound communication for business need
- Monitor electronic security perimeter for malicious communications
- Design/implement multifactor authentication system for interactive remote access
- Design/implement intermediate system for interactive remote access security

- Maintain evidence of compliance: **3 policy documents, 4 management standards, 18 security plans, 13 audit worksheets, 111 procedures,** hundreds of individual pieces of evidence resulting from maintenance activities.
- Across the many CIP requirements, UTS performs a number unique activities to support each CIP requirement

CIP-007

- Inventory all open ports/services on protected system for business need
- Inventory all protected system firmware, drivers, operating system and application software
- Identify security update sources for all inventoried software
- Monthly assess each identified software update source for newly released patches
- Install software security updates or mitigate identified vulnerabilities
- Identify malicious code protection methods for protected cyber assets
- Maintain records of regular updates/testing to signature based malicious code detection methods
- Configure event logging for protected cyber assets
- Collect/maintain event logs for protected cyber assets
- Design/implement alerting methods for protected cyber asset security related events
- Review/assess all security related events on protected assets for signs of compromise

CIP-oo8

- Develop cybersecurity incident response plans
- Conduct annual cybersecurity table tops/exercises Create after action reviews for each exercise or actual
- cybersecurity incident

CIP-009

- Develop recovery plans for protected cyber assets and systems
- Configure/manage backup tasks required for recovery data
- Manage a data protection technology system
- Test recoverability of recovery data for each protected cyber asset type annually

CIP-010

- Design/implement security configuration baselines for protected cyber assets
- Design/implement system to monitor for changes security configuration baselines
- Assess all changes for potential impacts to approved security configuration baselines
- Update security configuration baselines following changes
- Perform vulnerability assessments for protected cyber assets annually
- Inventory/secure all transient devices used to maintain
 protected systems

CIP-011

- Maintain standard for classifying/identifying sensitive information
- Manage non-disclosure agreements for vendor access to sensitive information
- Inventory designated storage locations where sensitive information is stored
- Identify security controls for designated storage locations
- Sanitize decommissioned protected cyber assets and media

CIP-012

 Monitor intra-control center communications for availability or compromise

CIP-013

 Perform vender security risk assessments for all material/service procurements for protected systems/assets

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Compliance; PCI-DSS

Description. The Payment Card Industry (PCI) Security Standards Council established a set of requirements in 2006 to ensure all companies that process, store or transmit credit card information maintain a secure environment. The standards, which originally applied to merchant processing, were expanded to ensure internet transactions. These requirements are known as Payment Card Industry Data Security Standards (PCI DSS), and are the core component of any credit card company's security protocol.

- UTS implements and manages technologies designed to protect credit card data and reduce compliance requirements and obligation.
- UTS participates and represents TPU technology within City of Tacoma PCI • Program.
- Implement technical designs, solutions, and frameworks to secure customer ٠ credit card data
- Ensure the ongoing ability for TPU to process credit card based transactions.

Key PCI Platforms & Systems

Value to the Utility – PCI DSS Compliance •

- **Common UTS PCI DSS Activities**
- Audit participation and evidence collection
- Data and compliance responses
- Technology design and implementation

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Element	Element, Utility Value
PCI Network Segment	The PCI network segment provides a dedicated network area where TPU can locate applications and platforms that process, store or transmit credit card data. The isolated environment serves to manage PCI requirements and compliance scope .
Tone Masking	Much like the PCI Network segment, Tone Masking is a set of technologies aimed at reducing risk and compliance scope obligation . Tone Masking uses technology to intercept and substitute audible telephone tones with flat tones to further mask and protect credit card information at the point of making payments by telephone.
IVR	As a core function of the IVR platform, TPU customers are able to <u>submit and pay their utility bills</u> through the system. These elements of the IVR system are located within the TPU PCI Network Segment.
EMV	EMV, originally founded by Europay, Mastercard and Visa (EMV) – is a secure payment technology used worldwide that <u>provides and allows</u> credit card transactions through payment terminals.
Cash Desk	As a function of SAP, Cash Desk allows the processing of incoming and outgoing payments, including the processing of credit cards.





Technology Project Highlights





Organization



UTS Organizational Scale

- Approximately **117 Full Time staff positions**
- Active and ongoing management of 2 technical bench contracts, allowing for staff augmentation Q1 2023, **37 contractors**
- Manage and further supplement projects & programs with Professional Service contracts (e.g., System Integrators, Trusted Advisors, etc.)

UTS Organizational Details

- 6 technology departments
- 28 functional teams
- 44 unique staff (FTE) classifications
 - 3 Labor Unions
- 13 cost centers

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UTS Budgetary

- 2023/2024 Biennium
- Labor: ~\$43M
- Other O&M: ~\$25M
- Capital: ~\$68M

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