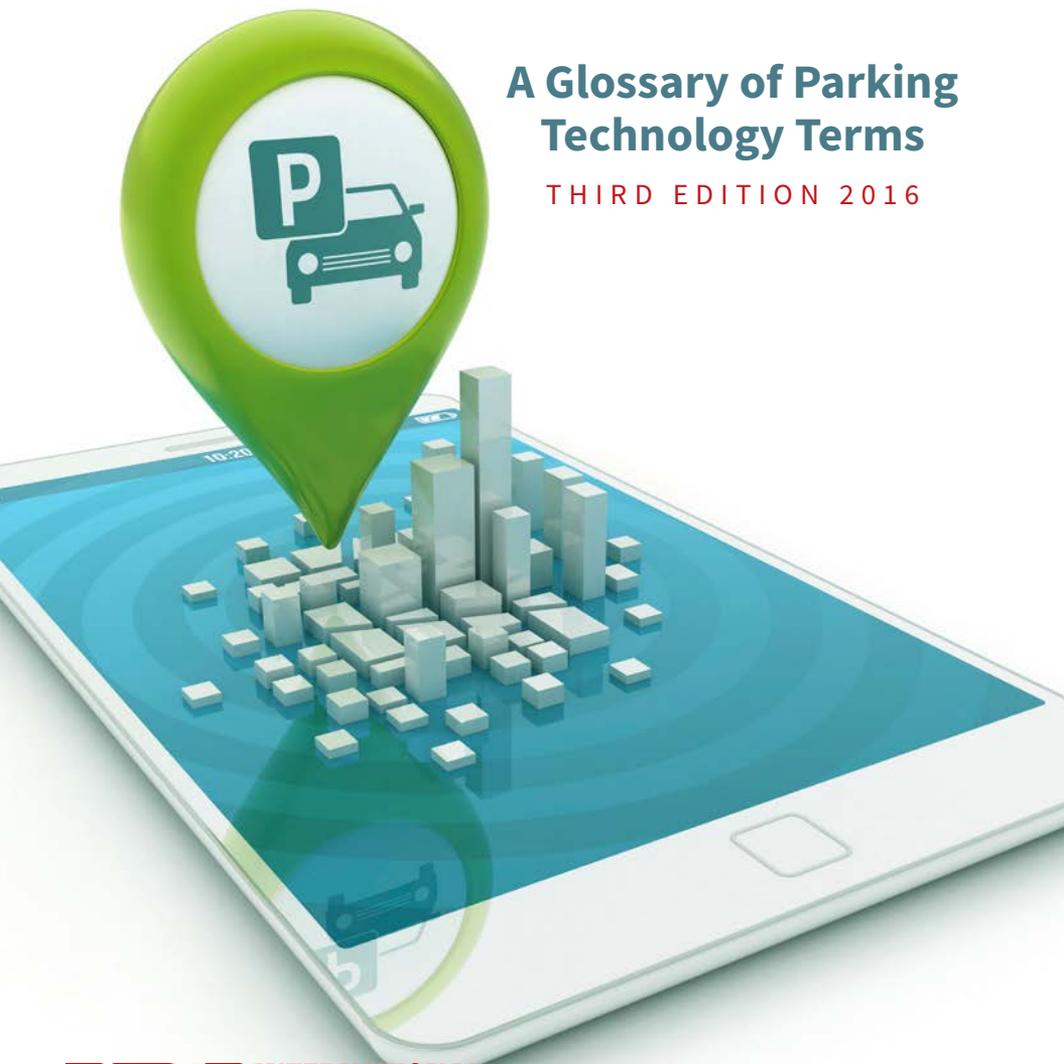# What's What in Parking Technology

A Glossary of Parking Technology Terms

THIRD EDITION 2016

IPI INTERNATIONAL PARKING INSTITUTE

Advancing the parking profession

A supplement to
The Parking Professional

What's What in Parking Technology

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During the last several years, the use of technology has accelerated in the parking and transportation industry. With these advances come new terms and changes to some definitions of terms we thought we knew. This glossary will help you better communicate with your peers, vendors, and the public when discussing parking technology.

Words printed in **blue** are defined elsewhere in this document.

5G Wireless

A new standard for wireless networks providing an access speed of 10gbps. It differs from 3G and 4G networks by the frequency spectrum, modulation, and bandwidth allocation schemes.

Access Control

Managing the access into and out of a parking **facility**; parker must present a valid parking **credential**.

Access Control System (ACS)

A system of hardware and software that controls access to **facilities** with barriers, gates, and/or doors.

Administrative Adjudication

A civil, not criminal, proceeding that is offered as an alternative to arguing a parking **violation** in court. The process is overseen by experienced attorneys and expedites resolutions and reduces litigation expenses.

Alarms

Used in **access control** and **revenue control systems**, these are system-generated messages that indicate potential problems with equipment or operational rules that have been broken (i.e., vehicle entered lane and then backed out).

Alternate Side Parking

A traffic regulation that prohibits car parking on one side of the street between certain hours of the day.

Americans with Disabilities Act (ADA)

A wide-ranging civil rights law first enacted in 1990 that prohibits, under certain circumstances, discrimination based on disability. In parking, there are specific requirements that range from how many spaces must be allowed for people with disabilities, to the size and location of these spaces, to the height of controls on the parking pay stations themselves.

Anti-passback or Passback Control

A setting that requires **ACS** users to enter and exit in proper sequence with their parking **credential** (i.e., entry, exit, entry, exit, etc.). Anti-passback is typically selectable as either "hard" or "soft:"

- Hard anti-passback rejects ACS users that are out of sequence, and should be set to send an **alarm** at the ACS controller and **Facility Management System (FMS)**.

- Soft anti-passback allows out-of-sequence ACS users to enter and exit, but reports and records violations with an alarm at the FMS for follow-up by the parking manager. Soft anti-passback provides a more patron-friendly experience while monitoring for misuse. This setting should be unique for each user.

In both hard and soft modes, each out-of-sequence event is reported as an exception transaction in the daily ACS access log. Many systems have the capability to clear the anti-passback condition via a password-protected resynchronization of the user's account.

Appeal

The disputing of a **citation**, also called adjudication or hearing. Can be regulated by statute in a municipal environment, and is often associated with an appeals panel in a university setting.

Application Program Interface (API)

A set of routines, protocols, and tools for building software applications. The API specifies how software components should interact and APIs are used when programming graphical user interface (GUI) components.

Artificial Intelligence (AI)

The intelligence exhibited by machines or software. It is also the name of the academic field of study that studies how to create computers and computer software that are capable of intelligent behavior.

Atomic Clock

An extremely accurate clock in which an electrical oscillator is controlled by the natural vibrations of an atomic or molecular system. Used in many parking systems to ensure accuracy and consistency of time between different systems.

Audit

The process of reconciling financial transactions with operating transactions for a day or other defined period. This is particularly sensitive in a **revenue control** operation, where a certain amount of theft is possible. Proper audit operations include ticket, spot, and shopper audits to ensure revenue security.

Authoritative Data Source

The system that has ownership of data or process. Many systems can access the data, but only an authoritative system maintains the original record and controls changes to the data. Example: The department of motor vehicles is the authoritative source of driver license numbers. A parking operation might use this number but is not allowed to change/alter it because the parking office is not the authoritative source.

Automated Pay Station (APS)

Allows for automated ticket processing in **central cashiering** facilities. It can supplement and/or replace cashiers. Sometimes called a **pay-on-foot** or pay-in-lane machine. Can accept multiple forms of payment and provide receipts.

Automatic Number Plate Recognition (ANPR)

An alternate term for **license plate recognition (LPR)**.

Automatic Vehicle Identification (AVI)

A system that enables automatic identification of a vehicle when it enters a parking **facility** so it can be authorized and permitted to enter and exit. AVI access methods include **RFID**, **LPR**, and **Proximity** cards.

Barcode

An optical, machine-readable representation of data that can be printed on a credential. Barcode formats can be **1D**, **2D**, or 3D. Examples include Code 39 (3 of 9), Code 128, PDF417, and QR.

Barcode 1D

A one-dimensional **barcode** is made from computer-generated lines of various thicknesses and spacing, representing a series of characters (usually letters and numbers). Examples include Code 3 of 9, or a UPC symbol.

Barcode 2D

A two-dimensional **barcode** is made from computer-generated dots, boxes, rectangles, spacing, and/or symbols, usually arranged in a square. A 2D barcode can represent many more characters than a 1D barcode and also support error-correction if part of the barcode is damaged or missing. Examples include PDF-417 and QR Codes.

Barcode /QR Imager

A camera-based or laser-based device used to read and decode QR and barcode codes. Camera devices used to read **2D barcodes**. Found in-lane equipment, handhelds, and most smartphones.

Batch

A collection of data processed together to update a system. This is an alternative to handling updates in real time as they occur.

Big Data

An all-encompassing term for any collection of data sets so large and complex that they become difficult to process using traditional data-processing applications. In other terms, bringing together a lot of data from different sources to reveal patterns and trends associated with human behavior.

Bill Stacker

A device used to stack bills for collection after they have been accepted for payment by a bill **validator**. The bill stacker usually has a unique lock to secure the money when the stacker is removed for collections.

Bill Validator

A device used in different parking technologies to accept only valid currencies and read the denomination of bills accepted for payment.

Bluetooth

A wireless technology standard for exchanging data over short distances (using short-wavelength from 2.4 to 2.485 GHz[4]) from fixed and mobile devices, and building personal area networks (PANs). Bluetooth is frequently used to allow two devices to connect and communicate (e.g., phone and car, phone and earpiece). Bluetooth can be used to support communications between devices or when implemented in an access credential, can communicate with lane equipment to authenticate either a parker or parkers.

Bluetooth Low Energy (BLE)

The smarter, intelligent, and low-energy version of the traditional Bluetooth operating in the unlicensed frequency band of 2.4 Hz. Technologically or commercially, it is used to connect all personal devices configured in a personal area network (PAN). It is basically designed and used to enable all machines and devices to be interconnected via internet, for example, smartphone. BLE uses very low energy and can produce over 1 mbps bandwidth for interconnection of many on-the-premises devices.

Bollard

A short post, generally three to five feet tall, that is used to create a visual or protective perimeter.

Boot (Immobilizer)

A device that is designed to prevent vehicles from being moved. In its most common form, it consists of a clamp that surrounds a vehicle wheel and is designed to prevent removal of both itself and the wheel.

Bulk Permits

A stack of permits purchased all at once. For example, a department or office may purchase bulk permits for a special event to pass out to its guests.

Business Intelligence

A set of tools and techniques to convert raw data into meaningful information. Usually, BI activities involve searching for correlations among multiple, often independent sets of data. See also **Data Analytics**.

Canadian Standards Agency (CSA)

Develops and publishes standards for industry, government, and consumer groups. Parking technology may contain a CSA registered mark to show that components of the product, such as electrical systems, have been independently tested and certified to meet recognized standards for safety or performance. The equivalent standard in the U.S. is **Underwriters Laboratory (UL)**.

Cardholder Information Security Program (CISP)

A program from Visa related to handling sensitive credit card data. For the most part, this has been replaced by **PCI-DSS**.

Card-In, Card-Out

An operating model that allows a customer to use a credit card as an access **credential** to enter and exit a parking **facility**. The credit card acts both as credential and payment mechanism. The advantage of credit card use for entry and exit is that the customer is not required to have a ticket. There are also significant revenue security advantages.

Car Park Management Systems (CPMS)

Represents multiple parking technologies beyond **access** and **revenue control**, which typically apply to **off-street parking** facilities. Other systems represented by CPMS include meter revenue systems, **parking guidance systems**, systems that track occupancy, and other systems that do not necessarily include access and revenue control.

Central Cashier

Can be a person (cashier) or pay station. The customer takes a ticket after it is processed and inserts it into an **exit verifier**. A central cashier staffed by a person may also take **citation** payments and sell **permits**. The key is that it is centrally located and not typically located in a lane.

Check Digit

A form of redundancy check used for error detection on identification numbers that have been input manually. For example, the ninth digit in a car's Vehicle Identification Number (VIN) is always a check digit. The other digits in the VIN go through a series of calculations to obtain the correct check digit. This allows computers to tell immediately if there is an error in the VIN, which often happens when someone transcribes a VIN or enters it into a computer.

Chip and PIN

A credit card payment method of accepting any **EMV smart card** technology that relies on an embedded chip in the credit card to be inserted into an **EMV**-approved payment device. The user to enter a 4-digit PIN to approve a payment transaction.

Chip and Signature

A credit card payment method of accepting any **EMV smart card** technology, which relies on an embedded chip in the credit card and verification with a signature by the user instead of an encoded four-digit PIN. This is similar to the verification used by current magnetic stripe-based credit cards.

Chip Card

Also known as an **integrated circuit card (ICC)**, refers to any pocket-sized card with embedded integrated circuits (aka computer chip) with specialized memory. Versions include both read-only and read-write.

Citation

A written or printed summons prepared by an official charged with enforcing traffic and/or parking regulations. Known outside the U.S. as an infringement notice or penalty charge notice.

Citation Processing

The life cycle management of a parking violation/citation from issuance of the citation, late notices, and delinquent fees through to DMV inquiries for additional outstanding **violations**, management reporting, and ultimately, payment.

Cloud / Cloud Computing

A service, application, or infrastructure hosted on a third-party virtual machine or data center. Cloud computing allows the user to reduce or eliminate hardware and software by purchasing it as an on-demand service accessible via the internet.

Code Division Multiple Access (CDMA)

A competing cell phone service to GSM, which is the world's most widely used cell phone standard. CDMA providers in North America include Verizon and Sprint.

Coin Box / Vault

A secured container for storage of coins and/or bills, normally removable for transport to a secure area for counting of contents.

Coin Escrow

A temporary storage area for coins, usually part of a mechanism that either accepts or rejects the coins based on certain criteria, e.g. enough coins to process a transaction, bent or invalid coins, transaction canceled, etc.

Coin Hopper

A compartment for storage of coins, usually segregated by denomination.

Coin Shutter

A cover for a coin entry slot that stops dust and contaminants from entering the machine.

Collection Agency

A business that collects outstanding debts on behalf of other businesses or agencies. The collection agency is normally paid a percentage of any monies collected. Their operations are regulated by the **Fair Debt Collection Practices Act**, the Federal Trade Commission, and state regulatory agencies.

Communications Latency

The amount of time between a request by a user and a response from the machine being used, i.e. time from insertion of a credit card to finalization of the transaction.

Comprehensive Asset Management Plan (CAMP)

Provides a long-term asset management approach to plan for and minimize the cost of buying, operating, maintaining, replacing, and disposing of parking-related capital assets.

Concession Agreement

A form of public-private partnership agreement in which the private entity pays the government agency for the long-term (in excess of 50 years) rights to all ongoing revenues generated by a system previously held by the government agency. Generally speaking, the hours of operation and parking rates (bylaws) are defined in the agreement and can change based on a prescribed schedule. Further changes to the operation's bylaws can result in additional payment(s) made by the private entity to the government agency or vice versa depending on the long-term effect on the parking asset. In most cases, upon commencing the concession agreement, the private entity upgrades the parking technology used within the system; all operating and capital expenditures are the responsibility of the concessionaire.

Counting System

A system used to track the number of parkers using sensors (**loops**, infrared**,** cameras, etc.) that vehicles pass through or over. Also referred to as an occupancy system.

Credential

Also referred to as a **permit**, allows access to a **facility** or to park in a certain on-street area (i.e. residential parking pass) and references **access control systems**.

Credit Card Chip

An integrated circuit embedded in a credit card that can store read/writable data and perform encryption programs that improve transaction security.

Credit Card Gateway

The infrastructure that allows a merchant to accept credit cards, connect with a processor or bank, and process credit card payments. Specifically the gateway is a service that connects the location's credit card device/server to the credit card processor's system.

Credit Card on File

A payment method used by a customer in which the customer registers a payment card with the merchant. The payment card is then linked to a credential or electronic token such that when the credential or token is presented a charge is made on the stored credit card information.

Credit Card Processing
The ability to take, validate, and authorize credit cards for payment.

Dashboard
A user interface that displays KPI (key performance indicators) intended to provide a view into the health of a business process. The metaphor of an automobile dashboard is adopted to emphasize the nature of the data being displayed on the page; it offers up-to-date analysis as to how a business is operating.

Data Analytics
The examination and analysis of data to reach a conclusion, make a decision, or improve a process.

Data Warehouse
An electronic repository of data and information that can be collected from many sources. It retrieves information from authoritative sources in **batch** or **real-time**, and provides the ability to perform business analysis searches and queries on the data.

Declining Balance Card/Stored Value Card/Campus Card
A card or account that stores a set amount of value available to a parker. The parker (cardholder) cannot spend more than that pre-loaded amount, but usually has the ability to add value to the card. May also be called an eWallet. These systems are typically found in **PARCS**.

Demand-based Pricing
Pricing parking supply based on demand. Generally speaking, the price of parking should be set so there is always an available space on any given block face.

DMV Search
The connection of a license or registration number to a motor vehicle licensing record through a state department of motor vehicle (DMV) search.

Electronic Coupon
A document provided in electronic form that allows the user to receive a discount for a service or product. Electronic versions normally contain a **barcode** to be read by a scanner.

EMV (Europay, MasterCard, and Visa)

A global standard for inter-operation of integrated circuit cards (IC cards or chip cards) and IC card-capable **point of sale** (POS) terminals and automated teller machines (ATMs), for authenticating credit and debit card transactions. **EMV chip cards** contain embedded microprocessors that provide strong transaction security features not possible with **magnetic stripe** cards.

Encoding Station

Connected to a **ticket validator**, these computers are typically used to allow a cashier to update the **magnetic stripe** of a parking ticket with new information (rate, payment, etc).

Encryption

The placement of data into a coded format that can only be read with an encryption "key" or formula that translates the data into a readable format.

Enterprise Fund

A fund created by the separation of budgeting and accounting mechanisms for functions that are self-supporting. This allows revenue and financial control of such operations to be separate from other services that are generally funded through taxes.

Entry Lane Station

An in-lane cashier station or booth in the entry lane to a **facility** that may be used to collect payment for parking; dispense token, ticket, or other item indicating time of entry or validity of vehicle; or detect **permits** or other permission to enter.

Equipment Leasing/Financing

An arrangement that enables a parking entity to obtain **PARCS**, enforcement tools, and/or other hardware and software without an upfront payment. Leasing or financing may be available or this purpose from vendors that supply enforcement tools, access tools, etc.

Ethernet

A type of networking technology. An Ethernet cable is a type of connection that is very common for communication between various pieces of hardware. An Ethernet cable is often used in communication between a computer and other devices such as router, switch, **handheld ticket writer**'s downloading cradle, etc.

E-validation

Solution that allows for the electronic issuance of **validations** to customers or the application of a validation amount to an active parking transaction electronically by a merchant. These solutions operate over the internet and provide real time access to validation customers and garage operators.

Event

This has two meanings in the parking world:

1. A special event with resources allocated to it, such as a parade, sports game, city event, or other activity or meeting that is finite in duration and requires its own dedicated inventory, unique pricing, or both.

2. An occurrence that may trigger an **alarm** via a **PARCS** in a **facility**. In this instance, everything that happens in a facility is an event (some systems refer to facility events as incidents to avoid confusion).

Exception Transaction

A non-cash transaction in a garage, such as use of a coupon to pay for parking.

Exit Verifier

Also called an exit station, hardware in a lane into which the customer inserts a dispensed ticket showing that he paid. The hardware verifies payment and raises the **gate**.

Extend-By-Phone

Used in conjunction with **pay-by-phone** and meters to allow parkers to add time to their parking sessions via phone. Typically, the meter will send a text message alerting the parker that his time is about to expire. Parkers can add time by texting back**.**

Facility

A parking garage, deck, or ramp containing parking spaces or stalls. In many cases, a surface lot can be defined as a facility. A deck may also represent a single level of a garage. A ramp is a facility where the entry and exit are on different levels.

Facility Management System (FMS)

The computer system and software that provides **real-time** reporting, monitoring, and controlling of the **PARCS**. In essence, this represents the brains of the system.

Fair Debt Collection Practices Act (FDCPA)

Designed to protect U.S. citizens from abusive, deceptive, and unfair debt collection practices. The FDCPA is relevant to the collection of any unpaid parking fees, fines, and penalties as it regulates the actions that may be taken in communicating with debtors.

Fee Computing Station or Fee Station

The **point of sale** equipment used to process payment, either in-lane or at a **central cashier**.

Gate

The hardware used to control access to a **facility** or surface lot.

General Packet Radio Service (GPRS)

Technology that enables data transfer through cellular networks. This technology is applicable for text, mobile internet, and other data communications but not voice service. This term has relevance in parking as there is very often a need for data transfer among different areas of a parking operation. For example, individual pay stations must communicate information back to servers and enforcement devices will communicate with **permit** databases to verify parking eligibility.

Geo-Fence / GPS Fence

A virtual perimeter around a specific point or area on a geographical map/area. This could be a small or large radius around a desired location set. Personnel are notified when a device enters or exits the area. Potential uses include compliance, fleet management, asset management, and especially marketing. In terms of marketing, geo-fencing enables the collection of location data that can help when trying to identify offers that are relevant to individual consumers.

Geographical Information System (GIS)

A system designed to capture, store, manipulate, analyze, manage, and present all types of spatial or geographical data.

Global Positioning System (GPS)

A space-based satellite navigation system used for location tracking. This system has many applications in parking. For example, GPS is used to track parking enforcement activity, including officer movement and ticket issuance. For garage-operators, GPS might be used to share information and special offers with potential customers in the area.

Global System for Mobile Communications (GSMC)

A standard for digital cellular network communications for the transfer of both data and voice. This term has relevance in parking as there is very often a need for data transfer among different areas of a parking operation. For example, individual pay stations must communicate information back to servers and enforcement devices will communicate with permit databases to verify parking eligibility.

Grace Period

Designed to give extra time beyond the published time allotted to pay for parking or to pay parking fines. With meter and pay station technology, an additional period of time may be allowed to the parker to remain in a parking space beyond the time paid. If the parker paid for 30 minutes, a grace period of five minutes would mean that a **violation** would not be issued until 35 minutes have passed. A grace period could apply to delinquent parking violations as well. While a parking violation may state that the violator must pay the original fine on the ticket within 15 days to avoid a penalty, the entity that issued this violation may choose a grace period of three days, which means accepting the original fine amount as payment in full within 18 days.

Handheld Ticketwriter

A computer that is small enough to be held in one's hand; used to write electronic parking **citations**.

In-car Meter

A piece of equipment used as a hangtag inside a vehicle. Money is linked to the meter and the customer uses those funds when he activates the meter to park.

Incremental Rates

A method for adjusting rates based on current demand. A parking garage that currently offers 50 available parking spaces may offer a parking rate of $0.25 per hour to encourage additional parkers. However, when parking spaces become less available during popular hours, the rate might increase to $3 per hour in the same area. This allows the parking management entity to maximize revenue during peak demand hours while encouraging additional parkers during off-peak or lower demand hours. One method for using incremental rates might be based on a study of the peak and off-peak hours, with rates based on the time of day and day of the week. Another method could be deployed dynamically through **demand-based pricing** by having rates adjusted automatically based on real-time data that tracks available spaces.

Integrated Circuit Card (ICC)

A **chip card** or any pocket-sized card with embedded integrated circuits with specialized memory. Versions include both read-only and read-write.

Intelligent Transportation System (ITS)

Advanced applications that, without embodying intelligence as such, aim to provide innovative services relating to different modes of transport and traffic management and enable various users to be better informed and make safer, more coordinated, and smarter use of transport networks.

Interface

The part of a system that allows another system to connect to it. Specifically, the interface defines how data is formatted and the rules for accepting data. Programs that pass information from one system to another are often referred to as interfaces.

Internet of Things (IOT)

The interconnection via the internet of computing devices embedded in everyday objects, enabling them to send and receive data. Many parking devices are internet-connected, and are subsequently part of the Internet of Things.

Interoperability

Systems that share data and processes.

Keypad

An integral set of buttons arranged in a block or pad. Keypads are used as access methods or input devices on parking equipment. Most keypads are alphanumeric and contain the entire alphabet and the numbers zero to nine or are styled after telephone keypads so that pressing a number key repeatedly changes the display to a corresponding letter. Keypads themselves can be mechanical, membrane (either flat or domed), or touchscreen.

Lane Controller

The electronics in the hardware associated with a lane. It choreographs the activity in the lane, activating and deactivating equipment based on triggers such as vehicle presence. The lane controller often sends and receives data from an online central database to allow access to the **facility**.

Lease Contract

Used to pay for parking spaces on a monthly basis or to obtain equipment used in parking enforcement without upfront costs to the management entity.

License Agreement

An arrangement with a software vendor that provides parking management or enforcement software. A software licensing agreement might outline specific uses of the software to prevent licensing infringement and protect a software vendor.

License Plate Inventory (LPI)

A process that uses **license plate recognition** or the manual collection of license plate information via handheld devices to count and keep track of vehicle license plates. It can be used in both controlled access and open **facility** environments to keep track of vehicles accessing a facility.

License Plate Recognition (LPR)

A vehicle identification technology that uses cameras to take pictures of license plates, read the images via character recognition software, and convert the images into text that a computer can use. LPR is common in **access control**, enforcement, tolling, and stolen vehicle detection applications. Sometimes called **ANPR** (automatic number plate recognition).

Lockbox

Payments accepted and often processed by an outside entity. Many banks and parking management vendors will provide lockbox services, including a mailing address for violators to send payments for parking **violations** and the processing of these transactions along with the deposit of funds to a bank account specified by the entity that issued the parking violation. In some cases the transactions may need to be delivered to the issuing entity as a file transfer on a daily basis so records are updated properly.

Long Term Evolution (LTE)

A type of cellular communications technology, more commonly referred to as fourth-generation, or 4G. With better reliability and transmission speeds than previous cellular technologies it's becoming popular to interconnect parking devices and facilities in remote locations using LTE.

Loops

Sensors that are placed in the ground on a lane or level of a **facility** to detect a vehicle passing overhead. They track occupancy and enable ticket dispensers or **permit** readers by identifying the presence of a metal object passing over the loop. Two-loop (or three-loop) systems can provide directional logic for vehicles entering or exiting a facility. Two-loop means that two loops are laid in the ground next to each other.

Loss Prevention/Shrinkage

A method of retaining profit and minimizing loss of revenue for parking management operations. Active auditing of all sources of parking revenue may help identify problem areas. Parking technology allows operators to automate the auditing process with such tools as permitting, **gates**, **smartcards**, and online payment options.

Lot Utilization

The process of recording the number of full and empty spaces in a lot or **facility** for analysis.

Magnetic Stripe

A strip of magnetic media usually found on a **credential** such as a credit card, hotel key, etc. The term is sometimes shortened to mag-stripe. The magnetic stripe can store a small amount of data.

Magnetic Stripe Reader (MSR)

A hardware device that reads **magnetic stripes** and converts information stored there to data that can be used by a computer or controller.

Management Contract

Often used for the entity responsible for managing parking and/or issuing parking citations to assign these responsibilities to an outside vendor. The chosen vendor may oversee **off-street parking** facilities or manage ticket issuance in all parking areas.

Metro Mesh Wi-Fi

Often used for wide-area broadband access networks as might be beneficial in a metro area. The mesh network will extend the transmission distance by relaying the signal from one device to another within the network.

Mobile Payments

Allow parkers to pay for their parking time with a mobile phone. Generally, a parking issuing entity will employ a **pay-by-phone** vendor to provide this technology to parkers as an additional payment method to facilitate the process of paying for parking.

Monetization

A form of public-private-partnership with a typical term length of 15 to 35 years. Generally, the investor/parking operator will provide the public a guaranteed annual payment as well as a share of revenues over an agreed-upon threshold. Under a monetization agreement, the city typically retains control over the rates and hours of operation. Adjustment to the rates and hours of operation could result in adjustments made to the annual guarantee or revenue share threshold.

Monitoring System

A system that allows the user to view system-generated activity, **alarms**, and occupancy within a **facility** via the **PARCS**.

Multi-space Meter

Freestanding hardware associated with multiple parking spaces, used in **on-street**, surface operations, and in certain parking facilities to manage payment for multiple parking spaces. Typically multi-space meters can be configured to facilitate **pay-and-display**, **pay-by-space**, or **pay-by-plate** operations.

Nest

A **facility** contained within another facility (called a "parent"). Nesting is often used to control access to a specific area within a larger parking facility via the use of **gates**.

Near Field Communication (NFC)

A set of standards for smartphones and similar devices to establish radio communication between them by touching them together or bringing them into close proximity.

Non-transient

Someone who uses a **permit** or **credential** to park on an ongoing basis (e.g., monthly parker). This can be in an access controlled facility or in a surface lot with no **gate**.

Occupancy

The percentage of spaces in a **facility** that are occupied. Rules can be set to limit the number of parked vehicles based on a schedule.

Off-street Parking

Refers to all parking not on/along the curbs of streets; includes private and public lots, garages, driveways, etc.

On-street Parking

Refers to all parking on/along the curb of streets.

Optical Character Recognition (OCR)

A technology that converts an image of text into the text itself. An example of its use is taking a picture of a license plate and using OCR to store the text so it can (for example) be stored in an excel spreadsheet for searching.

Parking Access and Revenue Control (PARC) / Access and Revenue Control (ARC)

Available in varying levels of functionality and complexity, access and revenue control systems allow parking owners and operators to control access and collect parking revenues from users. Available in varying types of equipment platforms, ARC systems, when combined with policy and procedure, can speed entry and exit from a **facility** and secure revenues through **audit** records.

Parking Analytics

Use of technology to collect and analyze parking **occupancy** and revenue data to plan for rates, hours, enforcement, new technology, and the possibility of dynamic or **demand-based pricing**. Real-time data of key indicators are typically displayed on a comment portal through a combination of graphics and key data for easy viewing and analysis by parking management for strategic decision making.

Parking Authority

A type of public benefit corporation that is chartered by the residing city or state. Parking authorities typically operate autonomously from the city or state while maintaining/operating a public service such as parking. Parking authorities can have control over either or both **on-street** and **off-street parking** assets. The parking authority often retains ownership over all revenues and expenses, however, if the city/state is still performing a certain function of the operation, revenues resulting from that operation may be distributed to the city/state in full or part.

Parking Guidance System/Wayfinding

A system, typically internal to a parking **facility**, that provides guidance to open parking spaces. These systems can include dynamic signage and individual floor and space availability indicators. Newer generation parking guidance systems detect individual space **occupancy** with stall sensors and can also share information with **GPS**-enabled vehicles and smartphone apps, which extend them beyond a garage or surface lot.

Pay-and-Display

A type of parking operation that requires the customer to pay at a pay station in advance and place a receipt on his vehicle. The customer selects the amount of time and makes a payment. Enforcement officers **audit** by looking in vehicles for receipts.

Pay-by-Phone

A type of parking operation that enables a customer to pay using a cell phone or mobile application. The pay-by-cell phone provider charges the customer for parking fees and reimburses the parking operator. Enforcement officer's **audit** by checking online databases for valid plates.

Pay-by-Plate

A type of parking operation that requires the customer to pay at a pay station in advance. The customer enters his license plate number at the station and makes payment. Enforcement officer's **audit** by checking the pay station or going online to view a list of license plates marked as paid.

Pay-by-Space

A type of parking operation that requires the customer to pay at a pay station in advance. The customer selects his parking space location (usually numbered) at the station and makes payment. Enforcement officer's **audit** by checking the pay station for a list of paid-for spaces.

Pay-on-Entry

Any type of system configuration in which the customer pays for parking as he enters the **facility**. It is often used for **event parking**. A pay-on-entry system can also be used to have customers pay a deposit and receive some portion of that money back on exit if there is more than one rate in effect at a given time.

Pay-on-Exit

Any type of system configuration in which the customer pays in-lane while leaving the **facility**. Payment may be made to a cashier or use credit card payment in the exit lane (**exit verifier**).

Pay-on-Foot

A type of parking operation that requires the customer to pay for parking at a pay station before exiting the **facility**. Customers insert their tickets into a machine and make payment, and the machine returns their ticket. Customers return to their vehicles and drive to the exit lane, where they insert their tickets into the exit station.

Payment Card Industry (PCI)

An association of (primarily) credit card brands such as Visa and MasterCard, that establishes application, data, and security standards for merchants, manufacturers, and processors.

Payment Card Industry Data Security Standards (PCI-DSS)

A set of guidelines for handling the transmission, storage, and processing of sensitive credit and debit card data.

Payment Card Industry Payment Application Data Security Standards (PCI-PA-DSS)

A validation program for manufacturers of payment processing equipment or software that validates their systems comply with data security standards for transmitting, storing, and processing credit and debit card data.

Permit

Anything that allows a driver to park in a designated area; also referred to as permission or **credential**. Can be a decal, hangtag, **RFID**, virtual (database record), etc.

Permitless Parking

A parking system that relies on **license plate recognition** to read pre-registered license plates that serve as parking **permits** or access **credentials**.

Personally Identifiable Information (PII)

This is the term given to one or more pieces of data that can uniquely identify or contact a single person. Most commonly this can be an ID number, name, phone number, mailing address, or similar data. By itself a license plate is not PII, but can become PII based on local regulations or if paired with other data to identify the owner or driver.

Point of Sale (POS)

The equipment used to process and record transactions and collect payment. Typically associated with credit card payments (slide, tap, etc.).

Point-to-Point Encryption (P2PE)

A credit card encryption methods approved by **PCI** in a specific standard (PCI-P2PE). Point-to-point encryption, which differs from end-to-end encryption (not PCI certified as P2PE), is a payment security solution that instantaneously converts confidential credit card data and information into indecipherable code at the swipe of the card to prevent hacking and fraud.

Portal

A view (doorway) into other systems, usually for the purpose of aggregating related but separate data into a single place for convenience.

Prepaid Parking

A parking transaction purchased in advance that allows a customer to park for a fixed amount of time. A prepaid parking transaction may or may not include a guarantee to park in the facility at a specific time or a specific space in which to park (i.e., **reservation**). Example is a discounted parking pass that allows a customer to park for 8 hours on first-come, first-served basis.

Proximity card

A **smartcard** that can be read without being inserted into a reader device.

Public-Private Partnership (P3)

A contractual arrangement between a public agency (federal, state, or local) and a private sector entity. Through this agreement, the skills and assets of each sector (public and private) are shared in delivering a service or facility for the use of the general public. See also **Monetization** and **Concession Agreement**.

Quick Response Code (QR code)

A type of two-dimensional **barcoding**, this has become popular due to its fast readability and large storage capacity as compared to standard barcodes. The code consists of black modules (square dots) arranged in a square pattern on a white background. Web links can be embedded in a QR code, which can be printed on a document or displayed on the screen of a smartphone.

Radio-frequency Identification (RFID)

Radio-frequency Identification is an electronic device with an antenna and a chip to communicate at a certain distance (<20 ft) within a frequency range. Tag is an electronic contactless transponder to work in conjunction with RFID. The RFID method relies on storing and remotely retrieving data using devices called RFID tags or transponders. RFID is used mainly in access and revenue control facilities and is another form of **permit**.

Real-time

An **interface** that updates instantly.

Replenishing Coin Changer

A piece of hardware within a **multi-space meter** or **pay-on-foot machine** that distributes coins for the purpose of providing change or for payment and is securely replenished as customers deposit coins for payment of parking or transit.

Reservation

A parking right purchased for a specific time period by a customer. Reservations typically guarantee a right to park and may include the right to park in a specific space. This differs from **prepaid parking**, which does not include a guarantee to park in a specific time.

Revenue Control

Involves **transient** and non-transient parker management and includes payment at the time of parking. Typically refers to the servers, terminals, and kiosks used for payment and **gate** control in a garage.

Revenue Control System (RCS)

A system for managing and auditing the payments of **transient** and non-transient parkers in a parking lot or **facility**. Also known as **PARCS**.

Scofflaw

A repeat parking offender. Many organizations maintain lists of known scofflaws.

Secure Access Module (SAM)

Based on a smartcard integrated circuit and used to enhance security performance in devices, a module that commonly is needed to perform secure transactions, such as credit card readers. The SAM can be used for secure authentication for smartcards or contactless **EMV** cards.

Short-term Parking

Parking spaces that are restricted to limited duration/time (usually less than a day and often less than four hours). Restricted or regulated parking and spaces with parking meters are common examples of short-term parking. Short-term parking is typically used near businesses to provide parking for customers while encouraging turnover.

Single-space Meter

Freestanding hardware associated with a single parking space, used in **on-street** and surface operations to manage payment for the parking space.

Single-space Smart Meter (SSSM)

Connected to the internet via a built-in modem that allows the meter to accept credit and debit cards, connect to vehicle sensors, or display time purchased from an integrated **pay-by-phone** provider. SSSMs are powered by an integrated solar panel that recharges a battery pack stored within the meter's housing.

Smartcard

A **chip card**, **integrated circuit card (ICC)**, or any pocket-sized card with embedded integrated circuits with specialized memory. Versions include both read-only and read-write.

Software as a Service (SaaS)

A software licensing and delivery model in which software is licensed on a subscription basis and is centrally hosted. It is sometimes referred to as "on-demand soft+C11ware." SaaS is typically accessed by users using a thin client via a web browser. SaaS has become a common delivery model for many business applications, including office and messaging software, payroll processing software, management software, customer relationship management (CRM), management information systems (MIS), and enterprise resource planning (ERP).

Solar Panel

An electrically connected set of photovoltaic modules within a frame that converts the sun's energy to a source of power. In parking, solar panels are typically used to supply power to hardware devices that are either hard to supply AC power to or when it is not financially reasonable to run power to the device. Many "green" parking facilities or surface lots are installing solar panels onsite to return power to the grid.

Solar Regulator

Controls the flow of power received from a **solar panel** to a battery pack. A faulty solar regulator can cause the battery to deplete its charge due to the use of hardware peripherals connected to the battery pack.

Space Sensor

A piece of hardware installed either at or above grade or on or inside a post that monitors the presence of a vehicle in a specific area or space. Sensors transmit this information in **real-time** or near-real-time to a web-based software application where the data is stored for analytical or enforcement purposes.

Tax Intercept

The act of a public agency to take a federal or state tax refund for the purposes of settling an outstanding government debt. These can include parking fines.

TCP/IP

Provides end-to-end connectivity specifying how data should be packetized, addressed, transmitted, routed and received at the destination. This functionality is organized into four abstraction layers that are used to sort all related protocols according to the scope of networking involved.

Ticket Validator

Electronically encodes validations either onto the original transient ticket or onto a separate **magnetic stripe** validation ticket. Encoding stations are a basic offering in **PARCS**.

Ticketless Parking

A parking scenario in which no ticket is required. Unique parking transactions are started in a revenue control systme via other credentials. This can be accomplished via **Card-in/Card-out**, **AVI**, mobile phone **barcodes**, mobile phone numbers, **LPR**, and other **credentials**.

Time-variable Pricing

Any user charge that varies by time period; helps manage demand and turnover.

Tokenization

When applied to data security, is the process of substituting a sensitive data element with a non-sensitive equivalent, referred to as a token, that has no extrinsic or exploitable meaning or value.

Traffic Management Center (TMC)

Serve as the mission control for an urban area's major street and highway network. This one location monitors traffic signals, intersections, and roads and proactively deploys traffic management strategies to reduce congestion and coordinate state and local authorities during special events, emergencies, or daily stop-and-go traffic.

Transient

A parker who pays for parking on a short-term basis, typically daily or less. Transient customers typically pay for the amount of time used versus buying a set period of time to park (i.e., a month, a semester, etc.).

Transportation Demand Management (TDM)

The implementation of policies or best practices that reduce the use of single-occupancy vehicles on public roadways in favor of public transportation. TDM strategies often lead to better ingress or egress of vehicular traffic in an urban or congested environment.

Turnover

How often a parking space goes from being unoccupied to occupied and vice versa within a given period of time; often measured over the course of a day or hours of operation.

Underwriters Laboratory (UL)

A global independent and not-for-profit product safety company that tests, verifies, and certifies consumer and commercial/industrial electrically powered products.

Validation

A discount provided to parking customers. The discount amount is usually charged to the department or business that gave the parker the validation. Validation also refers to the process of inserting a ticket into a **ticket validator** and recording payment on it. May also be called vouchers or coupons.

Variable Message Sign (VMS)

An electronic traffic sign often used on roadways to give travelers information about special events or warn of traffic congestion, accidents, incidents, roadwork zones, or speed limits on a specific highway segment. In urban areas, VMS are used within parking guidance and information systems to inform drivers of available car parking spaces or current **occupancy** levels.

Video Detection / Video Analytics

A system in which a closed-caption television (CCTV) camera or IP-based camera captures an image that can be read and recognized via specialized software. In the case of vehicle detection, the image is read and the software determines within a degree of certainty that what is on the screen is a car. This system is a very effective method of covering large areas such as intersections or entire streets. Analytics can be use to count cars, read licenses plates, categorize cars, and identify cars stopped in a lane in addition to other things.

Violation

Parking a vehicle in a manner against the law or local regulation.

Voice Annunciation

Deviced delivered verbal instructions, typically from a parking entry, exit or payment device to the customer.

Waiting List

A list of customers waiting for space to open up in a given **facility** or for a specific kind of **permit**.

Wi-Fi

A local area wireless networking technology that allows electronic devices to connect to a network, commonly using the 2.4 gigahertz GSM (specifically 802.11b and 802.11g) and 5 gigahertz (specifically 802.11a) radio bands. Devices that can use Wi-Fi technology include personal computers, video-game consoles, smartphones, digital cameras, tablet computers and digital audio players. Wi-Fi compatible devices can connect to the internet via a WLAN network and a wireless access point. Such an access point (or hotspot) has a range of about 20 meters (66 feet) indoors and a greater range outdoors.

Yield Management

A variable pricing strategy, based on understanding, anticipating, and influencing consumer behavior in order to maximize revenue or profits from a fixed, perishable resource such as parking spaces. Yield management is common in managing airline seats or hotel room reservations or advertising inventory.

What's What in Parking Technology

A Glossary of Parking Technology Terms

THIRD EDITION

Download this glossary at parking.org/techglossary.

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