**Wireless Network Architecture for a Nursery**

**Wireless Network Components for a Nursery**

1. **Internet Connection:**
   * **Purpose:** Provides the nursery with access to the global internet.
   * **Role:** The starting point for network connectivity, crucial for accessing online resources, communication, and cloud-based services.
2. **Router:**
   * **Purpose:** Directs data traffic between the local network and the internet.
   * **Role:** Manages traffic flow, assigns IP addresses, and ensures devices can communicate with external networks.
3. **Firewall:**
   * **Purpose:** Protects the network from unauthorized access and cyber threats.
   * **Role:** Monitors and controls incoming and outgoing network traffic based on predetermined security rules.
4. **Core Switch:**
   * **Purpose:** Connects all network devices within the nursery.
   * **Role:** Distributes network traffic efficiently and ensures high-speed data transfer between devices.
5. **Wireless Controller:**
   * **Purpose:** Manages multiple wireless access points.
   * **Role:** Optimizes network performance, manages security settings, and provides centralized control over the wireless network.
6. **Wireless Access Points (APs):**
   * **Purpose:** Provide Wi-Fi coverage throughout the nursery.
   * **Role:** Ensure seamless connectivity for wireless devices, allowing staff and IoT devices to connect to the network.
7. **Surveillance Cameras:**
   * **Purpose:** Monitor the nursery for safety and security.
   * **Role:** Provide real-time video feed to ensure the safety of children and staff, and to monitor any unauthorized access.
8. **Environmental Sensors:**
   * **Purpose:** Monitor environmental conditions like temperature, humidity, and air quality.
   * **Role:** Ensure a healthy and comfortable environment for the children by providing real-time data to staff.
9. **Network Management System (NMS):**
   * **Purpose:** Software for monitoring and managing the network.
   * **Role:** Allows IT staff to monitor network performance, detect issues, and manage configurations.
10. **Backup Power Supply (UPS):**
    * **Purpose:** Ensure network continuity during power outages.
    * **Role:** Provides emergency power to critical network devices, ensuring continuous operation.
11. **Authentication Server (e.g., RADIUS):**
    * **Purpose:** Manages user access and authentication.
    * **Role:** Ensures secure access to the network by authenticating users and devices.
12. **End-user Devices:**
    * **Purpose:** Devices used by nursery staff.
    * **Role:** Includes tablets, smartphones, and computers used for daily operations, communication, and accessing network resources.

**Detailed Network Architecture**

**1. Internet Connection and Router**

* **ISP Connection:** A high-speed internet connection from an Internet Service Provider (ISP) is the entry point.
* **Router:** The router connects directly to the ISP modem. It is responsible for directing traffic to and from the internet. It also provides NAT (Network Address Translation) and DHCP (Dynamic Host Configuration Protocol) services.

**2. Firewall for Security**

* Positioned after the router, the firewall filters traffic, blocking malicious content and unauthorized access while allowing legitimate traffic to pass through.

**3. Core Switch for Internal Connectivity**

* **Core Switch:** This switch connects to the firewall and serves as the central hub for all network traffic within the nursery.
* **VLANs (Virtual LANs):** Used to segment the network into different areas, such as administration, surveillance, and IoT devices, enhancing security and performance.

**4. Wireless Controller and Access Points**

* **Wireless Controller:** Connected to the core switch, it manages all APs, ensuring optimal coverage and performance.
* **Access Points:** Strategically placed throughout the nursery to provide complete Wi-Fi coverage. Each AP is connected to the core switch via Ethernet cables.

**5. Surveillance Cameras and Environmental Sensors**

* **Surveillance Cameras:** Connected to the nearest APs or directly to the core switch. They provide live video feeds accessible by authorized staff.
* **Environmental Sensors:** Also connected to the network via Wi-Fi, these sensors monitor and report environmental conditions in real-time.

**6. Network Management and Authentication**

* **Network Management System (NMS):** Located on a dedicated server, connected to the core switch, this system allows for centralized monitoring and management of the entire network.
* **Authentication Server:** Ensures that only authorized personnel can access the network, providing secure access control.

**7. Backup Power Supply**

* **UPS:** Ensures that critical network components such as the router, firewall, core switch, and wireless controller remain operational during power outages.

**8. End-user Devices**

* **Tablets, Smartphones, Computers:** These devices connect to the network via Wi-Fi provided by the APs. They are used by staff for daily operations, accessing the internet, and communicating.

**Illustration of the Network Architecture**

Here's a visual representation of the described network architecture:

1. **Internet Connection** ➔ **Router** ➔ **Firewall** ➔ **Core Switch**
2. **Core Switch** ➔ **Wireless Controller**
3. **Core Switch** ➔ **Wireless Access Points (AP1, AP2, AP3, AP4)**
4. **Core Switch** ➔ **Network Management System (NMS)**
5. **Core Switch** ➔ **Authentication Server**
6. **Wireless Access Points** ➔ **Surveillance Cameras and Environmental Sensors**
7. **Wireless Access Points** ➔ **End-user Devices**