# METHOD OF PERFORMING ROUTE LOOKUP IN A NETWORK ROUTER AND A SYSTEM THEREOF

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## Problem Statement

- New generation IP routers face a critical design challenge related to route-lookup mechanisms.
- Each incoming **IP packet requires longest-prefix matching** to determine the next hop, known as route lookup.
- Route lookup involves performing longest prefix match on ordered entries within ternary content addressable memory (TCAM) hardware.
- **TCAM hardware enables parallel search for matching entries but consumes high power**.
- Research has shifted towards reducing TCAM power consumption, such as designing power-efficient TCAM cells and using SRAM emulation.
- Conventional solutions maintain TCAM capacity equation while performing route lookup based on longest prefix match using TCAM hardware.

## Technology Category/ Market

**Category -** Networking & Network Infrastructure.
**Applications -** Data Communication,
Data Centers and Cloud Infrastructure,
Telecommunication Networks.
**Industry-** IT-Hardware, Network communication, Telecommunications, Data Centers.

**Market -** The global router market was valued at US$15.98 billion in 2022, and is forecasted to grow to US$26.07 billion by 2028. The market is anticipated to grow at a **CAGR of 8%** during 2023-2028.

## TRL (Technology Readiness Level)

**TRL – 3/4, Technology validated in lab.**

## Intellectual Property

- IITM IDF Ref. **1651**
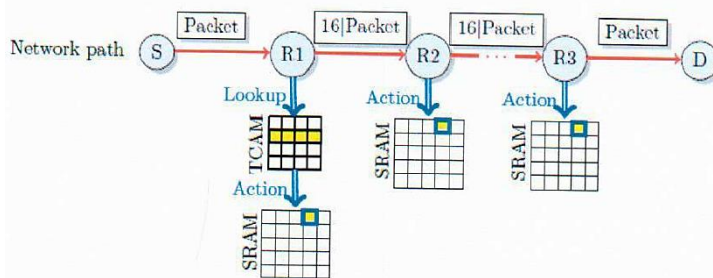- **IN 201841003640**
- **PCT/IN2019/050072 - Published**



**FIG. 1. illustrates a sharing of data packet between a source and a destination through multiple network routers based on a Unique Memory Index (UM).**

## Technology

- Present disclosure relates to **a method and system for routing data in a packet switched router** in a communication network, and to provide **a performing route look-up** in a network router (Fig. 1, 2 & 3).
- **First router shares a direct index** with one or more neighboring routers.
- **A second router of the one or more neighboring routers** encodes the direct index as part of a packet header and sends the packet header with encoded direct index to a next hop router of the one or more neighboring routers.
- **The next hop router then decodes the encoded direct index** and locates one or more route look-up results based on the decoding.

## Research Lab

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## Key Features / Value Proposition

1. **Power-Efficient Route Lookup:** The invention introduces a novel approach to route lookup using shared static RAM (SRAM) indices.
2. **Enhanced Hardware Efficiency:** Unlike conventional TCAM-based solutions, the proposed approach minimizes the reliance on power-intensive hardware components.
3. **Distributed Index Allocation:** The invention introduces a coordinated and distributed allocation of unique memory indices, enabling efficient routing decisions without the need for extensive route lookups at every router along the path.
4. **Versatile Decision Support:** The method supports various decision types, such as flow, flowlet, and destination-specific decisions.
5. **Economical Computation:** By eliminating the need for packet rewrites during route lookup, the method reduces computation costs.
6. **Scalability and Network Performance:** The invention's approach enables routers to efficiently process a large volume of incoming packets.
7. **Compatibility and Integration:** The technology can be seamlessly integrated into existing network router architectures, both within the router or external to it.
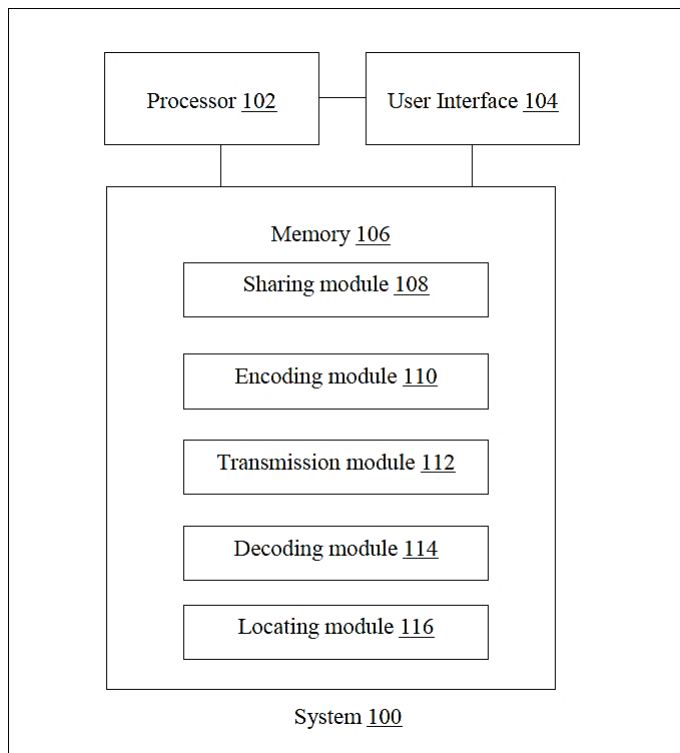


**FIG. 2. illustrates a block diagram of a system performing route look-up in a network router.**
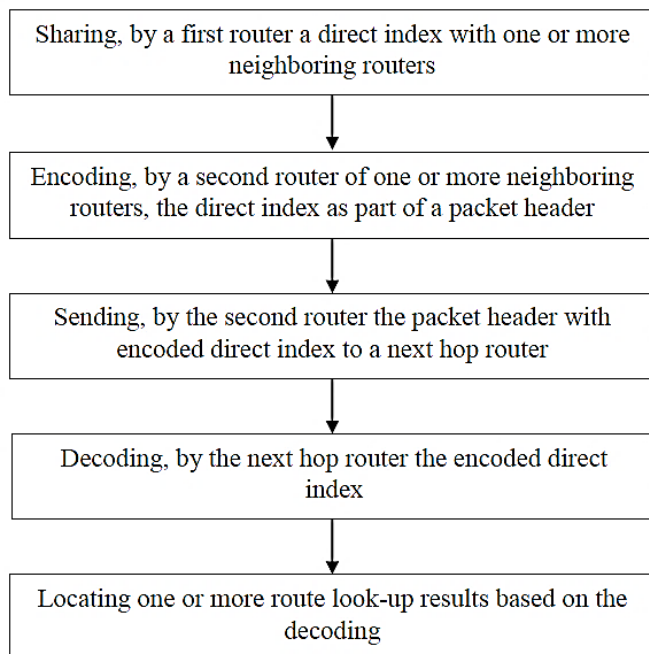


**FIG. 3. illustrates a method performing route look-up in a network router.**

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