

# DNS-over-TLS implementations

## Implementation Status

This table lists the best understanding of the current status of DNS-over-TLS related features in the latest stable releases of a selection of open source DNS software.

If there are errors or glaring omission please email [sara@sinodun.com](mailto:sara@sinodun.com)

**Also see** guides on [how to use NGINX and other proxies](#) to provide DNS-over-TLS, also see [here](#).

This works with a couple of provisos:

- Be aware that a client will think it is talking to a DNS-over-TLS server and so may keep connections open when idle even when not using EDNS0 Keepalive (as allowed by [RFC7858](#) ). The nameserver will see only TCP connections which were historically used just for one-shot TCP and may not be robust to many long-lived connections.
- Therefore this **will work much better** if the nameserver has robust TCP capabilities (as described in Sections 6.2.2 and 10 of [RFC7766](#)), and would be required for production level service. Any server that fully implements EDNS0 Keepalive ([RFC7828](#)) should meet this criteria.

See the [DNS Privacy reference material](#) page for more details on the individual features.

## Clients

Mode		Stub					Recursive resolver				
Software		ldns (drill)	digit	getdns (Stubby)	BIND (dig)	Go DNS	Knot (kdig)	getdns <sup>(a)</sup>	Unbound	BIND	Knot Res
TCP/TLS Features	TCP fast open <sup>(b)</sup>							P			
	Connect on reuse (Q/R, Q/R, Q/R)										
	Pipelining of queries (Q,Q,Q,R, R,R)	n/a									
	Process OOR (Q1,Q2, R2,R1)	n/a									
	EDNS0 Keepalive <sup>(c)</sup>										
TLS Features	TLS encryption (Port 853)										
	TLS authentication										
	EDNS0 Padding										

## Servers

Mode		Recursive			Auth		
Software		Unbound	BIND	Knot Res	NSD	BIND	Knot Auth
TCP/TLS Features	TCP fast open**						
	Process Pipelined queries						
	Provide OOR	WIP			n/a	n/a	n/a

	EDNS0 Keepalive***	WIP					
<i>TLS Features</i>	TLS encryption (Port 853)		(d)				
	Provide TLS auth credentials		(d)				
	TLS DNSSEC Chain Extension						
	EDNS0 Padding (basic)						

KEY:

- Green square - indicates latest release already supports this functionality
- Blue square - indicates that a patch is available in our git repo. See here for details: [DNS-over-TLS patches](#)
- Yellow square - indicates work in progress, or available in next release
- P - Requires building against a patched version of libunbound

(a) [getdns](#) uses libunbound in recursive mode

(b) not yet available on Windows

(c) Implies robust TCP connection management (see RFC7828 and RFC7766)

(d) See [this article](#) for how to use stunnel with BIND to provide DNS-over-TLS - thanks Francis Dupont!

Note pipelining and OOOOP are not applicable for synchronous applications.