

# CN\_Driver\_ModbusTcpClient\_APROL Runtime上的 ModbusTcpClient驱动安装和使用说明更新版

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### 内容纲要

# 版本信息

## 1. 目的

## 目的

和第三方设备之间采用 ModbusTcp 协议通讯,以前只能通过 APROL 里面的控制器才能和第三方设备 之间进行 ModbusTcp 的通讯,现在新增加了可以运行在 APROL 的 Runtime 系统上的 ModbusTcp 驱 动,这样即使没有APROL控制器的情况下,也可以采集第三方通过 ModbusTcp 协议的设备数据。注 意,APROL只能做 ModbusTcp 的 **Client(**或者说 ModbusTcp Master),支持的APROL版本为 **R4.2-06** (测试 **R4.2-05** 版本也可以支持)。

## 2. ModbusTcpClientDriver 驱动安装以及卸载

### 驱动安装和卸载

#### 🗛 注意事项

1)ModbusTcpClientDriver 不是 APROL 的标准驱动,因此该驱动是需要在 APROL 系统安装 之后的计算机上进行安装的!!!通常需要安装到相应的 engin 系统和 runtime 系统所在的计 算机上。

2) 对于 ROE 一体的计算机,只需安装一次驱动即可;如果是 Runtime 单独一台计算机或者冗 余 Runtime 系统的情况,那么首先需要在每个 Runtime 计算机都需要安装一次这个驱动,接下 来再到 engineering 所在的计算机再安装一次这个驱动。

2)项目备份不会备份 ModbusTcpClientDriver 驱动的,因此项目恢复后,还是需要在相应的计算机里面去安装 ModbusTcpClientDriver 驱动的。即项目恢复过程是不包含驱动安装的。
 3)驱动版本可能不定期有更新,请安装最新版驱动!驱动文件请咨询贝加莱工程师获取。

目前可提供的 ModbusTcpClient 驱动文件最新版本为 ModbusTcpClientDriver-R42-0.9.5-20.noarch.rpm。

不管在 Runtime 或者 engineering 计算机,安装驱动的方法都是一样的,下面以 engineering 计算机为例。

首先将驱动文件拷贝到 /home/engin/tmp 目录下,如果此时 CaeManager 等相关应用程序打开,请首先 关闭这些应用程序,然后再打开一个命令行界面(如 konsole ),以 su 用户登录,通过命令 rpm -ivh ModbusTcpClientDriver-R42-0.9.5-20.noarch.rpm 去安装驱动,如下图所示,没有报错信息表示驱动安 装成功。



## 3. ModbusTcpClientDriver 驱动使用

### 驱动使用介绍

ModbusTcpClient 驱动安装成功后,接下来我们就可以在工程师站的 **CaeManager** 里面去建立连接配置 驱动和调用相应的变量了。

3.1 建立ModbusTcpClientDriver连接 3.2 配置ModbusTcpClientDriver驱动

3.3 调用已经建立的ModbusTcpClientDriver连接的变量

首先从 CaeManger 的菜单 Extras —》Connection Type Editor... 打开 Connection Type Editor, 然 后去导入连接的模板,按下图里的说明步骤进行。



连接模板导入后,可以打开 **CaeManager** 项目里创建的Runtime系统去查看到添加的连接,然后可 以去新建连接、配置各种读、写请求以及相应的变量等,按下面步骤说明一步一步去做即可。 先新建一个 **ModbusTcpClientDriver** 的连接,如下图。



在创建的驱动连接下新建一个请求,如下图。



选择需要的功能码,设置 Slave Id (Id 值要小于255)和首地址, Cycle Time 最快到100ms。



### 在新建的请求下接着新建需要的通讯变量。

	<b>a</b> 🕺	Context	ModbusTcpClientDriver   I	ModbusTcpClientDriver   F	equests   ReadRequest1
onnections (CC)		Relevance:			
ModbusTcpClientDriver (5)			Important	Recommer	nded
ModbusTcpClientDriver		Request	ReadRequest1		
Requests { AuttragRead } (1)		Function code	Read Coil Status [fc01]		
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T ModbusTcpClientDrive T Conflicts	•				
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ModbusTcpClientDrive	Dei				
			Concerns and Conce		
alc Rename			Apply	OK	Close

设置数据类型、偏移地址等,如下图。

	Relevance:					e e e e e e e e e e e e e e e e e e e	
ModbusTcpClientDriver (5)	1	Important				Recomme	nded
ModbusTcpClientDriver     ModbusTcpClientDriver1	Connection I/C	I/O mode	I/O type	Tag	. Offset	! Data format	Description
O Requests { AuftragRead } (4)	M03_1	Input	UINT	0		Intel	
⊖ ReadRequest1	M03_2	Input	UINT	1		Intel	
<b>M</b> 03_1	M03_3	Input	UINT	2		Intel	
M03_2	M03_4	Input	UINT	5		Intel	
	和可以待到。 置。 Connection IO Mode根掛 不能修改; I/O type为5	IO这列是 居当前是Re 主义相应的	刘表亚尔 通讯变量: ad还是w 数据类型	文里时/ 名,可以 /rite请求 ,注意线	在这里 <sup>(、</sup> 分别 1) 1) 1)	9世二岁的 2继续修改; 300L, 寄存;	者Output 器为INT或
PoodPortuoet4							

ModbusTcpClientDriver     ModbusTcpClientDriver	(5)		求下面都会有相应的 青求的情况,因此都 生就是点去其中一:	内状态变量,可 3建议把这些机	可以通过这些状态 犬态变量定义上。	变量去
<ul> <li>ModbusTcpClientDriver1</li> <li>Requests { Auftrage</li> </ul>	Read} (4)	在弹出的	安量定义窗口里定义	义变量名,建议	义直接使用系统自	动定义
○ ReadRequest1 Image: M03_1		的变重, 直 六个状态3	〔接点击OK,然后细 变量都定义完成。	<b>E续下一个状态</b>	&受重旳定乂, 直到	到把这
M03_2						
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-	terror and				A COL	100
10						
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	▶ Import ▶ Export	•				and a

### 相应的各状态变量的含义如下图的说明。

Description	Name	Date type	Unit
Status variable of the order	Statusvariable	INT	
0 = request not active			
1 = request started			
2 = request active			
> 10 = error while processing the job. (Check syslog)			
A text is generated for each status code via this variable. This is especially helpful for status codes> 1.	StatusTextVariable	LSTRING	
Each time the job is successfully executed, the counter is incre- mented.	StatusRequestLoopCounter	INT	
The maximum value is 254, then it starts again at 1.			
Time required to complete the order. The time is measured from sending the request to receiving the last telegram.	StatusRequestOperationalTime	TIME	ms
Elapsed time between the last two cycles of the job. The measure- ment begins and ends each time the request telegram is sent.	StatusRequestCycleTime	TIME	ms
With this output, the processing of the request can be interrupted.	Disable Request	BOOL	

#### 接下来,可以去继续新建更多的请求或者新建更多的驱动连接,如下图所示,新建了多个驱动连接, 一个连接下新建了多个请求。

sTcpClientDriver1       I Coupling       I Application       I Config file       Descrit         adRequest1       ModbusTcpClientDriver1       ModbusTcpClientDriver       APROL.xml         M03_1       ModbusTcpClientDriver2       ModbusTcpClientDriver       APROL.xml         M03_2       ModbusTcpClientDriver3       ModbusTcpClientDriver       APROL.xml         ModbusTcpClientDriver4       ModbusTcpClientDriver       APROL.xml         ModbusTcpClientDriver3       ModbusTcpClientDriver       APROL.xml
equests { AuftragRead } ( 4 )       I Coupling       I Application       I Config file Description         adRequest1       ModbusTcpClientDriver1       ModbusTcpClientDriver       APROL.xml         M03_1       ModbusTcpClientDriver2       ModbusTcpClientDriver       APROL.xml         M03_2       ModbusTcpClientDriver3       ModbusTcpClientDriver       APROL.xml         ModbusTcpClientDriver4       ModbusTcpClientDriver       APROL.xml
adRequest1     ModbustcpClientDriver1     ModbustcpClientDriver     APROL.xml       M03_1     ModbusTcpClientDriver2     ModbusTcpClientDriver     APROL.xml       M03_2     ModbusTcpClientDriver3     ModbusTcpClientDriver     APROL.xml       M03_3     ModbusTcpClientDriver4     ModbusTcpClientDriver     APROL.xml
M03_1     ModbusTcpClientDriver2     ModbusTcpClientDriver     APROL.xml       M03_2     ModbusTcpClientDriver3     ModbusTcpClientDriver     APROL.xml       M03_3     ModbusTcpClientDriver4     ModbusTcpClientDriver     APROL.xml
M03_2         ModbusTcpClientDriver3         ModbusTcpClientDriver         APROL.xml           M03_3         ModbusTcpClientDriver4         ModbusTcpClientDriver         APROL.xml
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StatusRequestOperationalTimer
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StatusRequestLoopCounter
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adRequest4
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sTcpClientDriver2
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MiteRequest1_coil2
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StatusRequestOperationalTimer
Status cycle time
StatusRequestLoopCounter
IteRequest2
STCpClientDriver3
sTcpClientDriver4
No entry
StatusRequestOperationalTimer         Status cycle time         StatusRequestLoopCounter         iteRequest2         sTcpClientDriver3         sTcpClientDriver4

3.1 建立ModbusTcpClientDriver连接 3.2 配置ModbusTcpClientDriver驱动

3.3 调用已经建立的ModbusTcpClientDriver连接的变量

在驱动连接配置完成后,接下来需要去添加和配置驱动,如下图所示说明去新建和配置驱动实例,注 意,上一步配置了多少条驱动连接,那么这里对应需要配置相应数目的驱动实例的。否则,配置的驱 动连接里面的请求是不会执行的。配置好驱动后就可以关闭当前的编辑界面保存编译了。



3.1 建立ModbusTcpClientDriver连接 3.2 配置ModbusTcpClientDriver驱动

3.3 调用已经建立的ModbusTcpClientDriver连接的变量

在配置驱动并保存编译后,接下来可以新建一个只运行在 Runtime 任务上的 CFC,然后通过添加 Connection I/O 把前面新建的通讯变量和状态变量都添加到输入或者输出端如下图所示,然后这些变 量可以根据需求关联上相应的逻辑。后面的工作就是常规的编译、生成项目和下载项目了。

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# 4. ModbusTcpClientDriver 驱动的调试和诊断



里面安装 ModbusTcpClientDriver 后附带的仿真软件 ModbusTcpClient wizard。ModbusTcpClient wizard。ModbusTcpClient wizard。ModbusTcpClient wizard 打开的步骤如下图所示去测试。

如果上面 ModbusTcpClient wizard 也测试能正常通讯,接下来需要打开 StartManager 去查看一下ModbusTcpClientDriver 驱动是否添加以及相应的状态了,正常通讯是 ModbusTcpClientDriver 驱动的 State 一栏是 running 的,R 这一栏应该是绿色的小圆点,如下图中所示。最后再去查看一下 System message 看看有什么报错信息。

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	a applications					

### 4.2 有关ModbusTcpClientDriver状态的判断

对 ModbuTcp 通讯,当查看CFC监控数据没有正常通讯时,除了上面提到的一些诊断方法,尤其需要打开 StartManager 去查看一下当前 ModbusTcpClientDriver 驱动的状态是否正确。

如下图的 StartManager 打开 runtime 系统的截图,红色圈选部分为项目里面配置的 ModbusTcpClientDriver 需要重点关注的部分,正常的情况下,State 列驱动应该是显示 running 的,即表示给驱动已经正常运行了;如果显示为 lost 是不正常的,可能的原因是驱动没有安装或 者是其它问题,需要查看 System message 来辅助判断。

R 列正常情况下应该是绿色的小圆点,如果是黄色的小圆点,那么表示驱动虽然在运行,但是没有和 TCP 的 server 端有数据交换,此时需要去检查 TCP server 端。一方面可以双方相互去 ping 一下对方的IP地址看看是否能 ping 通,看看物理链路上是否通畅;另外使用 telenet 或者 nc (netcat) 命令来检测对方 502 端口是否开放了,命令如下图, telnet 对方 IP地址 端口号 或者 nc -vz 对方 IP 地址 端口号,如果对方端口打开,那么可以如下图的 Connected to 对方 IP 地址。如果相应 502 端口连不上,需要考虑对方是否启动了防火墙

Image: System (instance)       RL (M(S)         Image: System (instance)       RL (M(S)         Image: System (instance)       Runtime System + Operator system         APROL system name (instance):       Runtime System 01 (RS01)         Runtime System 01 (RS01)       S         Runtime System 01 (RS01)       S         Runtime System 01 (RS01)       S         Runtime System 01 (RS01)       Control computer name (instance):         Control computer name (instance):       Control Computer 01 (CC01)         CC- Account@Host Name:       runtime@cube05         Runtevel/Application/Instance       State         Ploate acquisition with for       -001         -001       ? unknown         -01       ? unknown         -01       ? unknown         -01       ? unning         -01<	- Louis Fodu Leib					Dar mema	Company License				
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Runlevel/Application/Instance       State       R       S       A       Description         HosDispatcher       001       running       5/5       Data acquisition with for         HosPisys       001       running       5/5       Process data basis sen         HosHttp       001       running       5/5       Process data basis sen         HosHttp       001       running       5/5       Process data basis sen         HosHttp       001       running       5/5       System and Self-Monito         HosHttp       001       running       5/5       Automatically created ti         ApStandard       running       5/5       Automatically created ti         ApSysMon       running       5/5       Control computer task         Cctest1       running       5/5       Control computer task         ModbusTcpClientDriver       001       stat       3/5       ModbusTcp server to pr         004       statt       01       running       5/5       Alarm archiving / distrib         Chronol LogServer       001       running       5/5       Alarm archiving / distrib		CC-Account@Host Name:	runtime@cul	be05							
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004       start       ✓       3 / 5       ModbusTcp server to pr         Runlevel 5       → Runlevel 5         -01       ● running       ✓       5 / 5       Alarm archiving / distrib         -ChronoLogServer       -001       ● running       ✓       5 / 5       Data compression log         □ TrendServer       -01       ● running       ✓       5 / 5       Data compression log		-001	running		12	3/5	ModbusTcp serve ModbusTcp serve	r to pro			
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# 5. 其它

## 其它事项

1. 该 ModbusTcpClientDriver 驱动,**不支持WriteRequest的Force Multiple Coil(fc15)和Force** Multiple Register(fc16),都是事件驱动型,因此请采用 fc05 或 fc06 !

2. 系统软件升级可能会导致驱动被删除的情况,升级后请检查启动是否存在,即查看 /opt/aprol/cnf/ ModbusTcpClientDriver/ 目录下是否有 ModbusTcpClientDriver 相关的 imp 和 gz 文件等,如果没有需 要重新安装驱动。

3. 有关 ModbusTcpClientDriver 在 server 端断开(网络断开或者断电等)一段时间后再连接的自动重连,由于不同的 server 可能有不同的机制,不能完全保证长时间断开后的自动重连是成功的。如果 server 长时间断开后再连接,通讯存在读或写数据不成功的情况时,可以通过 StartManager 去重启 ModbusTcpClientDriver 驱动或者使用 DownloadManager 去重新下载程序的方法来解决。

4. 其它限制请看本文档第八页的注意事项的内容!